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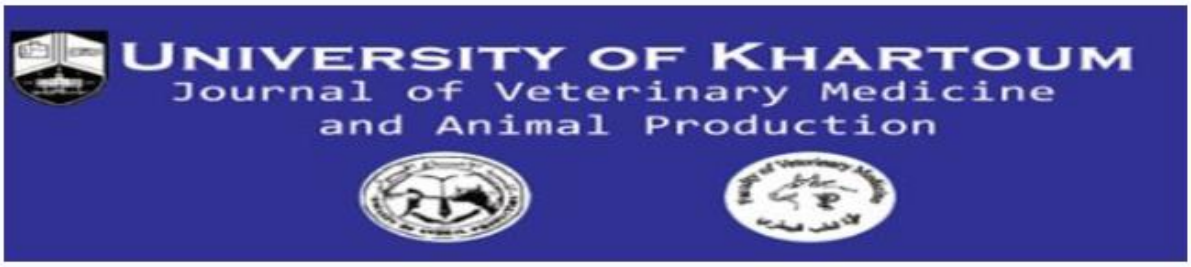

A Business Preview of Production Strategies in Private Small Scale Ice Cream Shops in Khartoum State Sudan

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Abstract

The aim of this study was to profile certain production strategies implemented by small scale private Ice-cream shops in Khartoum state, Sudan from a business perspective. The research relied upon primary data collection via performing a cross-sectional scientific questionnaire targeting senior managers in private Ice cream shops. Sample of the study covered a total of 30 shops stratified based on researches' study criteria and located in different geographical areas in Khartoum state. Collected data was analyzed using SPSS(ver.11.5) to obtain frequency of distributions. Main results showed that 58.3% of the participants produced soft ice cream; 41.6% of the shops used both fresh milk and powdered milk in production; 54.2% of fresh milk user shops stated they purchased fresh milk directly from farms; 62.7% used both natural and artificial flavors; 45.8% assured vanilla was the most used flavor; 50% of the shops stated they used both biscuit cones and plastic cups in packaging. The study recommended business men to exert more effort when considering production parameters related to this enterprise where scientifically structured business plans are to be performed to balance between inputs and outputs of this industry to reclaim good profit and insure best quality products.

Keywords: Ice cream private sector; business plan; production parameters; fresh milk; packaging; flavors; Khartoum.

المستخلص

هدف هذا البحث الي توصيف بعض استرتيجات ادارة الاعمال المستخدمة في الانتاج من قبل محلات الايسكريم الصغيرة فى القطاع الخاص فى ولاية الخرطوم . اعتمدت الدراسة علي جمع المعلومات الاولية باستخدام استبانات علمية تخدم اغراض واهداف الدراسة والتي استهدفت المدراء التنفذيين فى محلات الايسكريم الخاضعة للبحث والتي بلغ عددها 30 محل تم تصنيفها واختيارها علي اسس تناسب معاييرالبحث وموزعةعلي امكان جغرافية مختلفة في ولاية الخرطوم. تم تحليل البيانات باستخدام الحزمة الاحصائية SPSS . من اهم النتائج التي توصلت اليها الدراسة ان 58.3% من عينة الدراسة يقومون بانتاج الايسكريم الناعم41.6% ;يستخدمون اللبن الطازج والحليب المجفف معا 54.2%; من المحلات التي تستخدم اللبن الطازج يقومون

بشراء الالبان من المزارع62.7%; من المحلات يستخدمون النكهات الصناعية والطبيعية معا45.8%; اكدوا ان نكهة الفانليا هى الاكثر استخداما;50%من المحلات تقوم باستخدام عبوات البلاستيك والبسكويت معا. اختتمت الدراسة بعدة توصيات من اهمها ان على رجال الاعمال بذل مزيد من الجهد فى صياغة استراتيجات ادارة انتاج تتناسب مع طبيعة المشروع من خلال تنفيذ خطط عمل مصممة بصورة علمية توازن بين مدخلات ومخرجات الانتاج التي تتميز بها هذه الصناعة بما يكفل الربحية وجودة المنتجات المصنعة.

Introduction

Ice cream is frequently considered as a 'fun food' and is even considered as a 'junk' food; in reality ice cream is a relatively well-balanced wholesome easily digestible and delicious food (Deosarkar *et al.,* 2016). By definition "ice cream is a liquid mixture that turns into a paste after simultaneously shaking and cooling" (Corvitto, 2011) It is also defined as a pasteurized, homogenized and frozen food product prepared from dairy products, it is permissible to add nuts and any other additives and does not contain any fat other than milk fat (SSMO, 2013).The phrase "ice cream" varies from one country to another, phrases such as "frozen custard", "frozen yogurt", "sorbet", "gelato" and others are used to distinguish different varieties and styles, in some countries such as the United States the phrase "Ice cream" stands only for a specific variety, and most governments regulate the commercial use of the various terms according to the relative quantities of the main ingredients, notably the amount of cream, ultimately products that do not meet the criteria to be called ice cream are labeled "frozen dairy dessert" (Wikipedia, 2017).In Sudan all types of ice cream whether machine, canned, car ice cream or "Dandorma" are present (Esmail, 1997). Ice cream is constituted generally of seven categories of ingredients; fat (dairy or nondairy), milk solids-not-fat (the principal source of protein), sweeteners, stabilizers, emulsifiers, water, flavors and coloring materials, air becomes another important component once whipped and frozen (Goff and Richard, 2013; Wiwat, 2012). The use of fat derived from milk ingredients (e.g., cream and butter) is common in North America and many other parts of the world, while fat derived from non-dairy sources (e.g. coconut oil and palm kernel oil) is more common in parts of Europe and Asia (Goff, 2011). The limitations of using milk fat are; cost, hindered whipping ability, decreased consumption due to excessive richness and high caloric value (Abu Mezyed, 2015) while the limitations of using non- dairy fats are its little contribution to flavor as it may impart off-flavors and it may contribute to greasy textures (Goff, 2011). The best source of butterfat in ice cream for high quality flavor and convenience is fresh sweet cream from fresh sweet milk (El-Sharef, 2006). Ice cream processing operations can be divided into two distinct stages; mix manufacture and freezing operations (Clarke, 2008; Marshall *et al*., 2003). Mix manufacture consists of several operations: combination and blending of ingredients, batch or continuous pasteurization, homogenization, and mix aging (Evans, 2008). Dry ingredients can include whey powder, flavorings, emulsifiers and stabilizers, whilst the wet ingredients can include water, cream and melted vegetable oils or other fats (Tharp and Young, 2012). Freezing in the ice cream industry refers to the process in which the temperature decreases from 4°C to approximately - 6°C with simultaneous air incorporation, in a piece of equipment known as the freezer (Marshall and Arbuckle, 1996). The purpose of freezing ice cream is to produce a two-fold-formation of the foam structure and initiate the freezing process (Schmidt, 2004). Most of the manufacturing processes mix in the plain unflavored form, choosing to add flavoring

materials at the freezing stage where most flavorings are purchased in the ready-to-use form from specialists in that field rather than being prepared in the ice cream plant, they are chosen based on consumer preferences, availability, costs, equipment needed to introduce flavoring into the product, labeling implications (such as the perceived advantage of having "all natural" on the label), stability of flavoring material, and packaging considerations (Goff and Richard, 2013). On the other hand, Ice cream stabilizers are usually a group of ingredients (usually polysaccharides such as guar, locust bean gum, carboxyl methyl cellulose, xanthan, etc.) commonly used in ice cream formulations (Goff, 2011). During storage, ice cream could suffer deterious effects such as ice crystal growth and structural collapse, these deteriorations in quality can become more prevalent with higher freezer temperatures, greater temperature fluctuations and increased storage time (Abu Mezyed, 2015). In this study the researchers aimed to profile and hence analyze the different production parameter simple mented in private small sector Ice-cream shops in Khartoum state from a business perspective, in an attempt to highlight recommendations that would reflect the importance of Ice cream production as a promising business enterprise.

Materials and Methods

This study was performed in Khartoum state the capital of Sudan during the year 2018. The research used primary data collection as a base for the study using a cross-sectional questionnaire that intended to meet objectives of the research. The sample of the study was comprised of the small–sector privately owned Ice cream shops in Khartoum state located in different geographical areas, categorized and defined after an extensive field survey to identify Ice cream shops in the three localities of Khartoum state. Only shops that met the researchers' stratification criteria were chosen as the sample for the research. Stratification was based on two main parameters: privately owned shops that produce, manufacture and sell their ice cream products in their premises; privately owned shops that produce, manufacture and sell their ice cream products to other ice cream shops or retailers. A total of 30 shops met research criteria, and the study being qualitative in its context, all 30 shops were put under study, where primary data was collected through personal interviews with senior managers and shop owners. Collected data were hence analyzed using computerized Statistical Package for Social Science program SPSS (ver.11.5) to obtain the frequency of distribution.

Results and Discussion

Types of ice cream produced in shops under study were variable, where most of them 58.3% produced soft ice cream types in comparison to 41.7% that manufactured hard ice cream. In a study in the USA, (Goff and Richard, 2013) stated that 93.5% of U. S regular ice cream produced was hard frozen, while 6.5% was soft frozen in the year 2010. As for ice cream mix production, most of the shops 83.3% produced mix in their premises, while shops that bought it ready for production represented 16.7%, this result reflected that most shops prefer producing ice cream mix that carries their identity in ice cream industry a fact that strengths their image brand positioning. Goff and Richard (2013) found that in small establishments most of the mix frozen by firms was bought ready to manufacture. Moreover, 16.7% of the shops buying ready ice cream mix stated wholesalers' as their source of purchase.

Upon studying the use of milk in production, 41.6% of the shops assured they used fresh milk and powdered milk together, 37.5% used only fresh milk and 20.9% used only powdered milk. This coincides with Raga (2001) who stated that ice cream industry uses mainly dairy ingredients, especially fresh cream and fresh milk is mostly substituted by imported milk powder. Similarly, Arifeen (2012) stated that ice cream plants in Pakistan use both fresh and powdered milk. As for the source of fresh milk 54.2% of fresh milk user shops in this study stated they purchased fresh milk directly from farms, 16.7% bought from vendors and 8.3% bought from groceries, this result indicates that farms have higher credibility when it comes to the source of fresh milk. In a study in Pakistan, Arifeen (2012) stated that some ice cream firms use their own dairy plant as a source for fresh milk. Moreover, about 16.7% of fresh milk Most of the participants under study 62.7% used both natural and artificial flavors, while 20.8% used only natural flavors and 16.7% used only artificial flavors. In their study (Goff and Richard, 2013). pointed out that the economical brands of ice cream commonly contain predominantly more artificial flavoring than the average trade brand. The latter commonly contains pure and artificial flavor with pure flavoring predominating, premium and super premium products contain only pure extracts and flavors to complement the relatively high content of dairy solids and the very high qualities of all of the ingredients. Concerning ice cream ingredients and source of purchase, 20.8% of the shops stated using starch from local sources, 12.5% used imported starch and 12.5% used using shops used less than 100 liter/ week, 16.7% used 100-199 liter/week, while 8.3% used 200-350 liter/week, and 8.3% used more than 350 liter/week. This result indicates that ice cream industry is a profitable market for fresh milk producers**,** thus if more marketing distribution channels are opened both parties (dairy farm producers and ice cream producers) can establish strong business links. As for powdered milk used / week in the shops under study 25% stated they used 50-149 kg /week, while 16.7% used 150-249 kg/week, 8.3% of the shops used 250-349 kg /week and 8.3% used over 350 kg / week. This result coincides with (Goff and Richard, 2013) who stated that all ice cream formulations must include a unique source of MSNF, usually either concentrated or dried milk sources, to reach sufficient levels in the mix (Table 1).

starch from both sources. About 25% of the shops used local Guar Gum and 20.8% used imported Guar Gum. As for powder milk 45.8% of the shops purchase from local sources, 12.5% import powdered milk, 16.7% use imported fresh cream and 12.5% of the shops use fresh cream from inside the country, 20.8% purchase whipped cream from inside the country and 4.2% import whipped cream. Regarding colors and flavors used 54.2% stated purchasing locally while 33.3% import colors and flavors. As for ice cream powder mix 45.8% purchased from inside the country, 20.8% imported and 4.2% used ice cream powder mix from both sources. Syrups sources varied where 58.3% used local available sources while 29.2% imported.

Table 1: Ice cream types produced, ice cream mix production, type and quantity of milk used

Item	%
Type of ice cream produced in the shop	
Soft ice cream	58.3
Hard ice cream	41.7
Ice cream mix used for production	
Totally produced in the shop	83.3
Bought commercially and then mixed in the shop	16.7
Purchase source of ready ice-cream mix	
Other local ice cream shops	0
Imported	0
Wholesalers' shop	16.7
Type of milk used in ice cream production	
Fresh milk	37.5
Powdered milk	20.9
Fresh + powdered milk	41.6
Fresh milk source of purchase	
Directly from Farms	54.2
From groceries	8.3
From vendors	16.7
Quantity of fresh milk used in ice cream production/week	
>100 liter	29.2
100 – 199 liter	8.3
200-350 liter	25
< 350 liter	16.7
Quantity of powdered milk used in ice cream production/week	
50 -149 kg	25
150 – 249 kg	16.7
250- 349 kg	8.3
≥350 kg	8.3

Source of Sugar being one of the major ingredients in ice-cream was found to be mainly purchased from local sources where 95.8% of the shops stated using sugar from local sources. 8.3% of the shops used local available stabilizers while 12.5% imported their own. These results give a strong business analysis for the availability of various ingredients used in ice-cream processing, such results could act as a roadmap for investors and future importers who would like to invest in such an industry by making available high quality ingredients that would otherwise have to be imported (Table 2).

Table 2: Type of flavoring and coloring materials; ingredients used and their sources

Item	%
Type of flavoring and coloring materials used	
Natural only	20.8
Artificial only	16.7
Both	62.7

Ingredients used in Ice cream production, and their sources (%)

Ingredients / Source of purchase	Syrup	Stabilizer	Ice cream powder	Sugar	Flavors & colors	Whipped cream	Cream	Powdered milk	Guar gum	starch
Local market	58.3	8.3	45.8	95.8	54.2	20.8	12.5	45.8	25	20.8
Imported	29.2	12.5	20.8	0	33.3	4.2	16.7	12.5	20.8	12.5
Both	0	0	4.2	0	0	0	0	0	0	12.5

When studying the ranking of the most used flavors by shops, 45.8% of them assured vanilla flavor was the most used, followed by strawberry 29.2%, chocolate 12.5%, Oreo 12.5% and Nescafe 4.2%. These results reflect clearly that ice-cream shops are guided by consumer flavor preferences. Malik (2011) stated that vanilla, orange and pineapple flavors are the most liked flavors and chocolate the least with respect to consumer preference, while Robinson (1981) reported that vanilla is the most popular flavor, and the second most popular flavors being strawberry or raspberry, with chocolate coming third. These results contradict with El Owni and Khater (2010) who found that ice cream made from coconut and chocolate scored the highest flavor and taste, while the lowest score of flavor and taste were in strawberry (Fig 1). Upon studying the material used in ice cream packaging 50% of the shops under study stated that they used both biscuit cones and plastic cups, 45.8% used biscuit cones only while 4.2% used only plastic cups. This result coincides with Schmidt (2004) who stated that ice cream can be packed into containers of many different sizes and materials including paperboard, plastic, and foil laminates. On the other hand, Beijin *et al.,* (2010) found in their study that 56% of participants preferred ice cream cone, while 26% preferred the carton and the plastic took up 16% (Fig. 2).

Regarding the source of plastic cups used by shops under study, 58.3% stated using cups by dealing directly with factories, 33.3% bought from wholesalers while 4.2% had other sources probably imported. Such a result can be explained by the fact that cups bought from factories were much cheaper than other sources with the advantage of been delivered directly to ice cream shops, while those using imported sources claimed that the cup shapes they are using is not available locally.

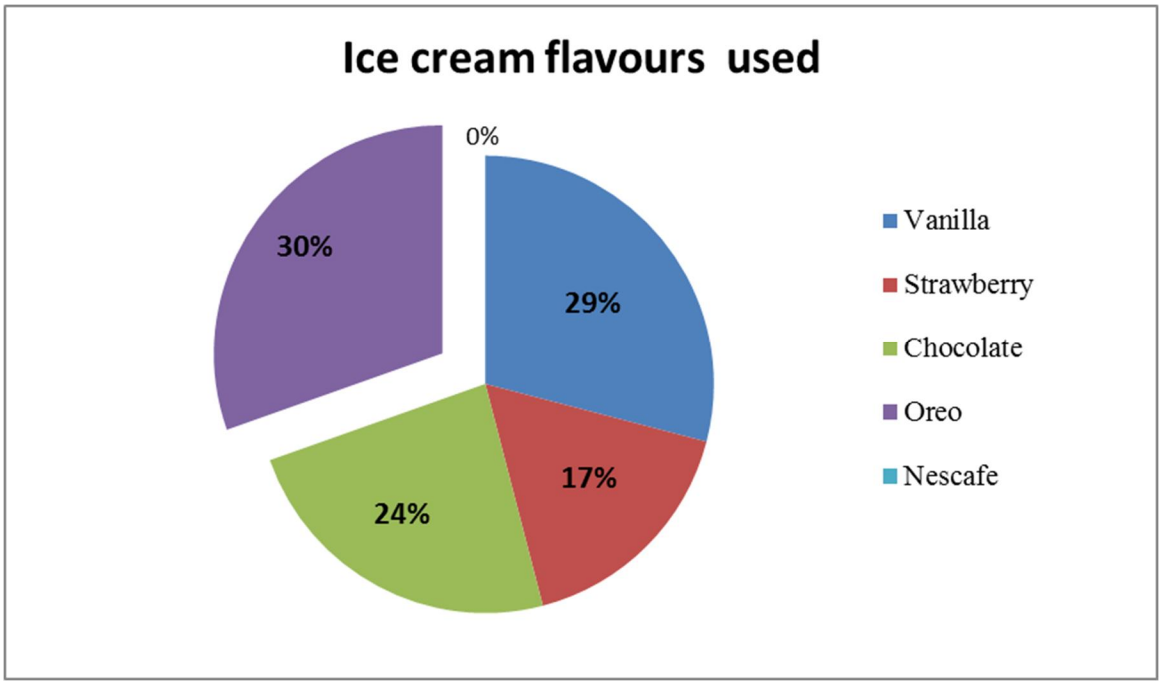
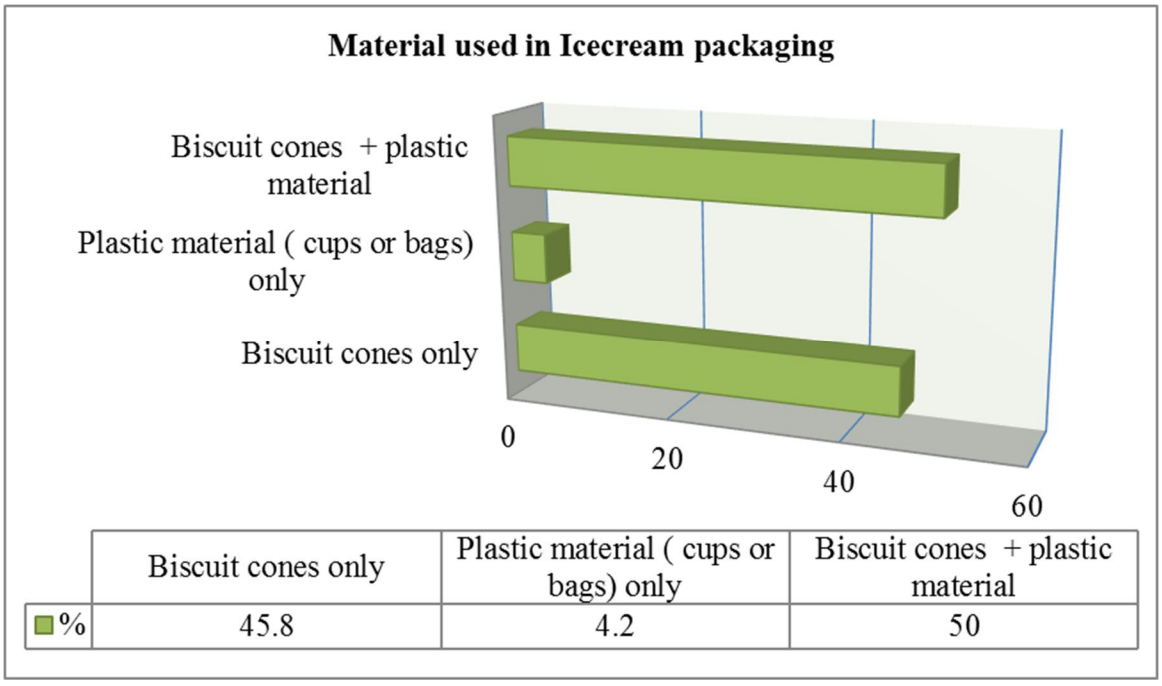


Fig 1: Ice cream flavors used



	Biscuit cones only	Plastic material (cups or bags) only	Biscuit cones + plastic material
%	45.8	4.2	50

Fig 2: Material used in ice cream packaging

As for size of packages most of the participants 54.2% used around 200-499 small plastic cups (60 g) / week, while 25% of the shops used less than 200 small cups / week and 12.5% used more than 500 small cups / week. About 37.5% of the shops used less than 200 medium size (120 g) plastic cups / week, while 33.3% used around 200-499 medium cups/ week and 25% used more than 500 medium cups. 41.7% of the shops used less than 200 large cups (200 g) / week, 41.7% used between 200-499 large cups / week and 8.3% of the shops used over 500 large cups / week. 25% of the shops used less than 200 family size cups (500 g) per week, 25% used between 200-499 family size cups / week, while 8.3% of the shops used over 500 family size cups / week. Analysis of these results reflected the diversity of consumer markets served by ice cream shops that includes teenagers, youth and families in addition to difference in consumer preferences, such results could act as a guide for investors when crafting business strategies and marketing plans. In their research Castelo (2011) stated that a greater contrast in terms of quite large/familiar sizes versus smaller packaging is expected to become more apparent; Raja (2001) found that 500ml packages account for about 60% of the total quantity sold, 200 and 250ml packages for 20–25% and the liter tetra pack accounts for 15–20%. When it comes to biscuit cones used in packaging, only 8.3% of the participants stated producing cones in their premises while 41.7% purchased cones, obviously these shop managers thought it is cheaper to buy cones rather than producing them. Moreover 29.2% of the shops that bought cones rather than producing them; stated buying biscuit cones from wholesalers, while 12.5% bought directly from factories. It is obvious that most of the ice cream shops buy biscuit cones from well-known wholesalers' usually located in Omdurman market located in Omdurman locality in Khartoum state, a market known for its reputation as being a trusted wholesale area that provides good quality and reasonable prices. In addition, 12.5% of the participants stated selling less than 100 ice cream cones/week, 4.2% sold 100-249 ice cream cones /week, 4.2% sold 250-349ice cream cones /week and 29.2% sold more than 350 ice cream cones /week. As for ice cream quantity sold/week; 41.7% of the shops sold less than 300 kg/week, 8.3% sold 300-499 kg/week, 20.8% sold 500-699 kg/week and 29.2% sold more 700 kg of ice cream/week. These results clearly reveal the high demand for ice cream in Khartoum State, which further assures reflects a profitable business enterprise. Rao *et al*. (2004) and Ali *et al.* (2007) stated that generally in developing countries markets, higher incomes result in diet upgrading, with increased demand for meat, dairy products, and other high value products (Table 3).

Table 3: Ice cream packaging source and quantity used/ week; quantity of ice cream sold/ week

Item			%
Plastic cups source			
Direct from a local Factory			58.3
Wholesalers' shops			33.3
Imported			4.2
No. of plastic cups used /week			
No	**< 200 cups**	**200-499 cups**	**≥ 500 cups**
Size			
Small (60 g)	25	54.2	12.5
Medium (120 g)	37.5	33.3	25
Large (200 g)	41.7	41.7	8.3
Family (500g)	25	25	8.3
No. of Ice cream biscuit cones used / week			
< 100 piece			12.5
100-249 piece			4.2
250-349 piece			4.2
≥ 350 piece			29.2
Biscuit cones used			
Are produced in the same shop			8.3
Not produced in the shop			41.7
Source of biscuit cones for shops that don't produce them			
Directly from a local factory			12.5
From wholesaler shops			29.2
Quantity of ice cream sold / week			
> 300 Kg			41.7
300-499 Kg			8.3
500-699 Kg			20.8
≤ 700 Kg			29.2

Conclusion

Ice cream production in the private sector is a promising business venture considering most of the ingredients can be available in considerable prices and yet products are considered as an added value category in terms of business and marketing. For this enterprise to be more profitable, businessmen are urged to exert more effort when considering production parameters related to this enterprise where scientifically structured business plans are to be performed to balance between inputs and outputs of this industry to reclaim good profit and insure best quality products. It is also recommended that sectors of government concerned pay more effort to such growing enterprises. In addition, research institutes are urged to extend research information that could assure profitable and quality production strategies in the ice cream industry.

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