

Quality and safety of chilled food business essay

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" Refrigerated foods are one of the fastest growing sectors of the foodservice industries and groceries in the world. This sector is divided into two categories: chilled and frozen food"[1]. Perishable Chilled Food:" The fresh foods must be maintained at temperatures in the range -10°C to $+8^{\circ}\text{C}$ in order to preserve their quality shelf life and microbiological safety at the point of consumption"[2]. History of chilled food in brief: In 1960 the chilled foods were sliced pies and meats. Later on, household refrigerators were stocked with dairy desserts and salad dressings . Twenty years later, soups, pizzas, vegetables, ethnic snacks, sandwiches , and pastas were kept chilled. Nondairy desserts, Sandwich fillings, stocks,, sauces , prepared fruit, dips and leafy salads were chilled in the 1990s"[3], specialty sushi, breads, were typical by the 2000s. Quality and safety of chilled food: For getting Chilling, it required to reduce the food temperatures to below the room temperatures, but above -10°C . This results in efficient short-term preservation of food by retarding many of the chemical, microbial, physical, and biochemical reactions integrated with deterioration and food spoilage. At chilled temperatures (between 10°C and $+8^{\circ}\text{C}$) the growth of microorganisms occurs slowly and deterioration reactions and food spoilage are inhibited to extent that quality and food safety is preserved for extended periods and sometimes for a few weeks, longer than the fresh counterpart. However, chilled foods are considered fresh and they go down gradually throughout their life. The activity and growth of microorganisms, will be present in the food ingredients or may be introduced when the food is processed or handled, may cause deterioration. High and Safe quality chilled foods require rapid chilling and low temperatures during storage, minimal contamination during manufacture handling, consumer storage and distribution retail

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display"[4]. Frozen Food: Freezing conserve foods from the time it is cooked until it is eaten. Freezing food slows down decomposition by turning residual moisture into ice, inhibiting the growth of most bacterial species. In the food commodity enterprise the procedure is called IQF or " Individually Quick Frozen". The frozen food do not add any preservatives because microorganisms don't grow when the temperature of the food is below -9.5°C, which is sufficient on its own in preventing food spoilage. Long-term protection of food may call for food storage at even lower temperatures.

History of frozen food:" The ancient Chinese started using ice cellars to preserve food through the cold winter months and beyond since 3000 years BC. The modern frozen food industry, only dates back to the early 20th century when Clarence Birdseye - fur trading in Labrador, Canada in 1917 - observed how local inhabitants preserved meat and fresh fish by letting it freeze rapidly in the cold Arctic temperatures. He also discovered fish left over from a previous expedition that had been preserved by the intense cold. The locals had discovered that freezing made it possible to preserve products at the very peak of quality"[5].

Quality and safety of Frozen Food:" To preserve the storage life of foods we have to freezing them which will slow down the detrimental reactions that promote limit quality shelf and life food spoilage. However, it should be recognized that a number of biochemical and physical reactions can still happen and many of these will be appeared when required conditions of production, handling and storage that are not maintained. Furthermore few microorganisms grow below -10oC, it should be recognized that freezing and frozen storage is not a reliable biocide"[6]. For producing a safe frozen food it requires the same attention as the chilled or fresh counterpart. According to the safety record <https://assignbuster.com/quality-and-safety-of-chilled-food-business-essay/>

of frozen foods, a false sense of security should not reduce the care and diligence while distributing, preparing and handling the frozen food.

Categories of Frozen food: According to our research we can conclude the following frozen food categories: MEAT: Beef, veal, lamb, pork, and ground meats POULTRY: Poultry and ground poultry SEAFOOD: Fish, shellfish, breaded seafood products. DAIRY: Milk, Eggs, Ice cream, cheese. FRUITS and VEGETABLES: Juices and home or commercially packaged. BREADS: Breads, rolls, muffins, cakes. PASTRIES: Cakes, pies

Part 2: Supply chain management: Definition." A supply chain is the sequence of organizations"[7]- their functions, facilities and activities- that are involved in producing and developing a service or product. " The sequence starts with basic suppliers of raw materials and extends all the way to the end user.

Facilities include factories, processing centers, warehouses, retail outlets and offices distribution centers,"[8]. Functions and activities include purchasing, quality assurance, forecasting, inventory management, scheduling, distribution, production, delivery, and customer service. Accordingly there are two kinds of movement in these systems: the physical and the exchange of information. The physical movement of material, generally in the direction of the end of the chain. The exchange of information, which moves in both directions along the chain. Every business organization is part of at least one supply chain, and many are part of multiple supply chains. The number and the type of organizations in a supply chain are determined by whether the supply chain is manufacturing or service oriented. Value chains, supply chains, and demand component. The supply chain referred to the value chains, a term that reflects the concept that value is added as goods and services progress through the chain. Supply or value chains are typically

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comprised of separate business organizations, rather than just a single organization. Furthermore, the supply or value chain has two components for each organization: a demand component and a supply component. The demand chain is the sales and distribution portion of the value chain. The length of each component depends on where a particular organization is in the chain; the closer the organization is to the final customer, the shorter its demand component and the longer its supply component. The supply component starts at the beginning of the chain and ends with the internal operations of the organization. The demand component of the chain starts at the point where the organization's output is delivered to its immediate customer and ends with the final customer in the chain. All organizations, regardless of where they are in the chain, must deal with supply and demand issues. The goal of supply chain management is to link all components of the supply chain so that market demand is met as efficiently as possible across the entire chain. This requires matching supply and demand at each stage of the chain. Note that except for the beginning suppliers and the final customers, the organizations in a supply chain are both customers and suppliers. The need for supply chain management" Recently, most organizations did little to manage their supply chains. Instead, they tended to concentrate on their own operations and their immediate suppliers. However, a number of factors make it desirable for business organizations to actively manage their supply chains. The major factors are: Increase the level of outsourcing; Organizations are increasing their levels of outsourcing, buying goods or services instead of producing or providing them themselves. As outsourcing increases, organizations are spending increasing amounts on supply-related activities (packaging, wrapping, loading and unloading, <https://assignbuster.com/quality-and-safety-of-chilled-food-business-essay/>

moving, and sorting). A significant amount of the cost and time spent on these and other related activities may be unnecessary. The continuous improvement for the operation;"[9]During the last decade, many association adapted practices such as lean production. As a result, they were able to achieve improved quality while wringing much of the excess costs out of their systems. Moreover, there is still room for improvement, for many organizations, the major gains have been realized. The rise of transportation costs; Transportations costs are increasing and they need to be well managed. The Competitive pressures; Competitive pressures have lead to an increasing number of new products for customization shorter product development cycles. The increase of globalization; Increasing globalization had expanded the physical length of supply chains. The importance of e-commerce; the increasing importance of e-commerce has added new dimensions to business buying and selling and has presented new challenges. The need to manage inventories; Inventories play a major role in the success of failure of a supply chain, so it is important to coordinate inventory levels throughout a supply chain. Shortages can severely disrupt the timely flow of work and have far reaching impacts, while excess inventories add unnecessary costs. It would not be unusual to find inventory shortages in some parts of a supply chain and excess inventories in other parts of the same supply chain. The complexity of supply chains; Supply chains are complex; they are dynamic and they have many inherent uncertainties that can adversely affect the supply chains, such as late deliveries, inaccurate forecasts, equipments breakdowns, substandard quality, and cancelled or changed orders.

Characteristics for an effective supply chain management.

Movement within a facility:

Movement of goods within a manufacturing facility is part of production control. The steps where materials move within a manufacturing facility are the following: From incoming vehicles to receiving. From receiving to storage. From storage to the point of use. From work center to the next or temporary storage. From the last operation to final storage. From storage to packing/shipping. From shipping to outgoing vehicles. In some instances, the goods being moved are supplies, in other instances, the goods are actual products or partially completed products; and in still other instances, the goods are raw materials or purchased parts. Movement of materials must be coordinated to arrive at the appropriate destination at appropriate times. Workers and supervisors must take care so that items are not lost, stolen, or damaged during movement.

Incoming and outgoing shipments

Overseeing the shipments of incoming and outgoing goods comes under the heading of traffic management. This function handles schedules and decisions on shipping method and times, taking into account costs of various alternatives, government regulations. The needs of the organization relative to quantities and timing, and external factors such as potential shipping delays or disruptions, highway construction, truckers strikes. Computer tracking of shipments often helps to maintain knowledge of the current status of shipments as well as to provide other up-to-date information on costs and schedules.

Evaluating shipping alternatives

A situation that often arises in some businesses is the need to make a choice between rapid (but more expensive) shipping alternatives such as overnight or second-day air and slower (but less expensive) alternatives. In some instances, " an overriding factor justifies sending a shipment by the quickest means possible, so there is little or no choice involved"[10]. However, in other examples, urgency is not the primary consideration, so there is a choice. " The decision in such cases often focuses on the cost savings of slower alternatives"[11]versus the incremental holding cost (here, the annual dollar amount that could be earned by the revenue from the item being shipped) that would result from using the slower alternative.

Electronic Data Interchange:

Electronic data interchange (EDI) is the direct, computer-to-computer transmission of inter-organizational transactions, including purchase orders, shipping notices, debit or credit memos, and more. Among the reasons companies are increasingly using EDI are: Increased productivity. Reduction of paperwork. Lead time and inventory reduction. Facilitation of just-in-time (JIT) systems. Electronic transfer of funds. Improved control of operations. Reduction in clerical labor. Increased accuracy. The use of EDI linkages with other organizations can be part of a strategy to achieve a competitive advantage by leveraging logistics performance. In addition, in some JIT environments, EDI serves as the signal for replenishment from the manufacturer to the supplier.

Distribution Requirements Planning (DRP)

Distribution requirements planning (DRP) " is a system for inventory management and distribution planning. It is especially useful in multiechelon warehousing systems (factory and regional warehouses). It extends the concepts of material requirements planning (MRP) to multiechelon warehouse inventories, starting with demand at the end of the channel and working back through the warehouse system to obtain time-phased replenishment schedules"[12]for moving inventories through the warehouse network. In effect, management uses DRP to plan and coordinate transportation, warehousing, workers, equipment, and financial flows.

Just In Time (JIT) Deliveries

JIT systems often require frequent deliveries of small shipments. This can place a tremendous burden on the delivery system in several respects. One is the increased traffic that results. Instead of one large delivery per week, a company switching to JIT may require many smaller loads every day. Multiply that by the number of parts obtained from suppliers, and you can begin to appreciate the potential traffic nightmare, resulting delays in receiving shipments, and disruption in production. Also, there is the likely increase in transportation cost per unit. There is often a fixed cost per delivery, even if only a partial load is delivered. Smaller trucks are one possibility, but that, too, will generate a cost.

The Global Supply Chain

As international trade barriers fall, more companies are expanding global operations. This is presenting tremendous opportunities and opening up previously untapped markets for products and services. It has also increased <https://assignbuster.com/quality-and-safety-of-chilled-food-business-essay/>

the number of competitors, and even companies that operate only within a single country are faced with increased foreign competition. Managing a global supply chain that may have far flung customers and/or suppliers magnifies some of the challenges of managing a domestic supply chain. Obviously, distances and lead times become more critical as the supply chain becomes longer. So, too, does the possibility of having to deal with (perhaps many) different languages and cultures. Currency differences and monetary fluctuations are other factors that must be dealt with, and possibly additional modes of transportation.

Creating an Effective Supply Chain

Creating an effective supply chain requires connecting the market, distribution channel, processing, and suppliers. The design of a supply chain should enable all participants in the chain to achieve significant gains, hence giving them an incentive to cooperate. It should enable participants to share forecasts, determine the status of orders in real time and access inventory data of partners.

Keys to effective supply chain

Successful supply chain management requires integration of all aspects of the supply chain: warehouses, suppliers, factories, distributors, and retail outlets. This requires cooperation among supply chain partners in planning, coordination of activities, and information sharing, which, in turn, requires partners to agree on common goals. Coordination and information sharing are critical to the effective operation of a supply chain. Information exchange must be reciprocal: Partners share forecasts and sales data, as well as information on inventory quantities, impending shortages, breakdowns,
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delays, and other problems that could impact the timely flow of products and services through the chain. Information has a time value. Thus, instead of each organization in a supply chain making plans based on a combination of actual orders plus forecasts of demand of its immediate customer, by sharing data on end-customer sales and partner inventory on a real-time basis, each organization in the chain can develop plans that contribute to synchronization across the chain.

Steps in creating an effective supply chain

Creation of an effective supply chain entails several key steps. They are:

Develop strategic objectives and tactics. These will guide the process.

Integrate and coordinate activities in the internal portion of the chain.

This requires overcoming barriers caused by functional thinking that lead to attempts to optimize a subset of a system rather than the system as a whole, and transferring data and coordinating activities. Coordinate activities with suppliers and with customers. This involves addressing supply and demand issues. Coordinate planning and execution across the supply chain.

This requires a system for transferring data across the supply chain and allowing access to data to those who engage in operations to which it will be useful. Consider the possibilities of forming strategic partnerships. Strategic partnering occurs when two or more business organizations that have complementary products or services that would strategically benefit the others agree to join so that each may realize a strategic benefit. One way this occurs is when a supplier agrees to hold inventory for a customer, thereby reducing the customer's cost of holding the inventory, in exchange for the customer agreeing to a long-term commitment, thereby relieving the

supplier of the costs that would be needed to continually find new customers, negotiate prices and services, and so on. In many cases, organizations have accomplished much of what is required to achieve the second and third steps in the process; it is the first and last steps that will require attention. In all steps, designers must address the following performance drivers: Quality, Cost, Flexibility, Velocity, Customer service. Quality, cost, and customer service are perhaps obvious. Flexibility refers to the ability to adjust to changes in order quantities but also to the ability to adjust to changes in product or service requirements. Velocity refers to the rate or speed of travel through the system. Velocity is important in two areas: materials and information. Inventory velocity refers to the rate at which inventory (material) goes through the system. Faster is better: the quicker materials pass through the supply chain, the lower inventory costs will be, and the quicker products and services will be delivered to the customer. Information velocity refers to the speed at which information is transferred within a supply chain. Again, faster is better: the quicker information (two-way flow) is available to decision makers, the better their decisions will be in planning and coordinating their parts of the supply chain. Benefits of effective supply chain management. Generally, benefits of effective supply chain management include higher productivity, lower inventories, lower costs and improved ability to respond to fluctuations in demand, higher profits, shorter lead times and greater customer loyalty.

Managing the Food Supply Chain

" Supply chain management involves coordinating activities across the supply chain. The main issue is taking customer demand and translating it

into corresponding activities at each level of the supply chain"[13]. The key elements in this process are outlined in the next section. A cold chain is a Supply Chain for perishable items requiring low temperatures in order to protect the chilled and frozen food. Furthermore, a cold chain can be used in many other areas, such as food, pharmaceutical and chemical products. The common thing of those products is the high requirement on the temperature, humidity, light or other particular conditions. Therefore, the two main differences between supply chain and the cold chain are: The cold chain demands a lot on the operating conditions. The cold chain has the possibility to be spoiled. Elements in the food supply chain management." The supply chain in the food industry starts with ingredients or raw materials. Selection of the appropriate raw materials is needed to achieve the desired end product. Suppliers are contracted to supply materials that meet the requirements outlined on the raw material specification sheet. There may be a number of concurrent suppliers of the same ingredient to ensure availability is always guaranteed, especially for high volume businesses, such as in fast food restaurants. A traceability system allows manufacturers to trace the source and path of each ingredient or raw material throughout the production process. This is very important if any incidences of contamination come to light after a product has been placed on the market. Having such safeguards in place can prevent or minimize any widespread risks to consumers"[14]. The success of the supply chain depends on efficiency and timeliness which is related to the logistics that will be discussed in more detail in the upcoming section. Legislation and good manufacturing practices (GMP) within the cold chain are designed to ensure effective control of safety and quality. General legislative directives relevant

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to cold chain operations include: GMP intends to give the best guidance available on practical means of achieving and maintaining high quality chilled and frozen foods. There are key guidance points given for each stage of the operation:

Step 1: Getting the basic requirements

Raw materials and packaging Set product specifications, e. g. microbiological, temperature, quality, hygiene Adopt ' approved suppliers' and incoming product inspection regimes Comply with packaging directives, e. g. contact materials, environmental Ensure packaging meets technical requirements, e. g. barrier, insulation

Step 2: Control the manufacturing operation Use appropriate freezing equipment to maximize quality Pass through ' zone of crystallization' as quickly as possible. Regard freezing as complete only when product reaches -18°C throughout If manufacture requires heating, cool as soon and quickly as possible Ensure storage and transportation of chilled foods is below 4°C High risk categories require special (segregated) manufacturing conditions.

Step 3: Maintain the appropriate storage conditions

Maintain primary and secondary freezer stores at between -20°C to -28°C Maintain frozen product temperatures at less than -18°C Maintain chill stores at between 0°C and 8°C Maintain chilled products that spoil rapidly at between -1°C and $+2^{\circ}\text{C}$ Maintain microbiologically susceptible products at between 0°C and $+5^{\circ}\text{C}$ Minimize air temperature variations in cold stores Ensure optimum stacking patterns in storage regimes Monitor and record air temperatures in warmest part of the storage facility Provide alarms to indicate temperature abuse

Step 4: Distribution of chilled and frozen foods," Unless you grow your own food, all the food we consume has undergone some - and probably many - forms of transport. In the simplest case, fresh vegetables may be taken to a local market. Consumers then buy

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produce and drive, walk or cycle it home. This first step may be eliminated if the produce is bought at the farm-gate, such as in the case of strawberries in the summer time, but then it is still transported home by the customer. A product may be a key ingredient for another product and thus is transported to a manufacturing site elsewhere by road, rail, sea or air. This procedure can be repeated before it is finally sold as a finished product, which again requires transport to get it to the point of sale. Transportation of foods results in what is termed "food miles" and its economic and environmental impacts are debated today. Commodity products, such as grains, can be bulk or container shipped around the world in huge transporter ships. In bulk shipping the grain goes straight into the hold of the ship instead of being transported in containers on board the ship. Some countries are major commodity exporters to other parts of the world, such as Australia and Canada for wheat export and pulses. Further on, we will see some examples of innovations and research in shipping transport. The storage, packaging and transport steps of the supply chain can involve many technologies, needed to maintain product quality. Chilled or frozen distribution ("cold-chain") and modified atmosphere environments are used for many products. Foods can be stored and packed in modified or controlled atmospheres. Controlled atmospheres are useful for crops that ripen after harvest or deteriorate quickly even when stored optimally"[15]. For primary frozen distribution, temperatures between -12°C and -18°C For local frozen distribution, -12°C to -15°C For chilled foods temperatures control, ensure Category 1 (-1°C to +2°C): fresh meat, poultry, offal, comminuted meats, fish and shellfish, smoked fish. Category 2 (0°C to 5°C): pre-cooked foods, cured meats, sandwiches, pasteurized milk/cream. Category 3 (0°C to

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80C): fruit and vegetables, fermented meats, hard cheese, bakery products, butter/margarine, spreads. Step 5: Ensure appropriate conditions for retailing/foodservice. Inspect and measure incoming food for temperature control. Monitor in-house cold store facilities. Operate retail display cabinets according to manufacturer's guidance. For cook-chill and cook-freeze products, ensure a minimum reheating operation of 70°C for 2 minutes is achieved. Maintain food temperatures above 63°C for foodservice. Doubts on the integrity and control of food temperatures at any stage of the cold chain can be allayed or confirmed by the following simple sequence of checks: Inspect air temperature recorders and thermometers to determine temperature history of product.

Logistics of the cold chain

The cold chain contains two logistic systems: the refrigerated transportation (reefer trucks, containers) and the surface storage (Refrigerated warehouse). To maintain safety in chilled foods, there are prescribed utmost temperatures. Currently, the Agreement on the International Carriage of Perishable Foodstuffs specifies the following maxima for transportation: 7°C for meats; 6°C for meat products, butter; 4°C for poultry, milk and dairy products; 3°C for offal; 2°C for fish.