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GREEN SUPPLY CHAINS

An Action Manifesto

Case Study 4: Green Packaging and Reverse Logistics - The Free Pack Net SRL Case Study

Background

The use of disposable packaging is a non-core business for producers of domestic white goods; therefore based on an innovative business model, Free Pack Net decided to develop a business that rents out high protection packaging and arranges for the return of the packaging from the market via a network of reverse logistics.

The mission of Free Pack Net is therefore to serve its customers through improving the value chain, a reduction of costs, and by using sustainable economic development that integrates reusable packaging rental, with an advanced logistics management service.

Product and logistics system innovation

The packaging designed by Free Pack Net followed research and analysis of the most suitable materials and the technical, economic, and practical feasibility of such packaging.

At present (2009), Free Pack Net is the only business in the world to have created structural clampable packaging that satisfies the technical requirements of the distribution chain for domestic white goods.

After many improvements and redesigns to optimize costs and to maximize the technical characteristics of the product, Free Pack Net succeeded in creating a structural and modular packaging that is able to resist lateral and vertical loads up to 1.2 tonnes.

In addition, since the packaging is made up of modular elements, it can be collapsed when returned, such a volume reduction enabling reverse logistics costs to be controlled and contained.

The operating sector for domestic white goods is characterized by few producers, who operate worldwide, producing domestic white goods that have standard dimensions (60 x 60 cm). For example, washing machines produced by Whirlpool have the same dimensions as those produced by other producers such as Indesit, by Electrolux etc.

However in the last 30 years the sector has had no packaging innovation at all.

In Europe the cost/volume ratio for the transport of white goods is reasonable ; the transport cost of a washing machine weighing 85 kg on average varies from €15 to €18. The European distribution network for white goods (and therefore also that in return) also has nodes that are distributed uniformly and therefore to return the packaging of a washing machine, clean it, recondition it, and resupply it to the factory does not cost more than €3.50 per piece.

Research and development

Free Pack Net's research and development activity consists of the creation of a preliminary advanced project of the structural packaging. During this activity, it is necessary to design the finished product considering the following:

- the type of material that one wants to use;
- the weight that it must support;
- the volume and dimensions.

The objective here is not only to define the technical parameters required to guarantee the physical characteristics and performance criteria of the structural packaging, but is also to design the packaging considering the costs. Every additional gram in weight or every cubic centimetre in volume will have significant incremental costs when creating the mould/moulding the packaging due to an increase in raw material, but above all, in the reverse logistics circuit, where transportation costs increase with volume.

The strategic importance of R&D/advanced project is considerable, as an error in the design of the product can be fatal, both for failing to meet the technical performance that the packaging must guarantee, and for the exponential increase in costs; accordingly this activity is undertaken in house.

Prototyping and testing

Prototyping is closely linked to the above preliminary project, but it differs since it consists of adopting the guidelines defined in the project phase and transferring them to the production methods of the moulds and the packaging. Prototyping therefore belongs to the production process and in particular to the development of production technologies

that are ever more highly performing and efficient and whose characteristics will ensure that the product complies with the technical specifications described in the preliminary project. Tests are then made to verify that the product passes the technical trials for which it is guaranteed.

The strategic importance of this activity is comparable to that of R&D/planning, since both activities are profoundly intertwined, continuously affecting each other. Prototyping/testing is carried out externally from Free Pack Net by those companies who, in a later phase, create the mould and the packaging. Due to the intertwining of R&D/advanced project and prototyping /testing, this involves a collaborative method of working.

Manufacturing 1

This activity can be split into two subcategories:

- Creation of the mould.
- Creation of the structural packaging.

The mould, intended as the production asset that enables production of the package, is made using as a guiding reference the preliminary project and the results of R&D. The production of the mould's components is carried out by both the same companies that go on to make the packaging (using the mould) and by those third party companies who are specialized in the production of moulds. The production of the moulds takes place in many businesses, each one creating a component. The finished mould comes from the aggregation of all the components, ready to be used in the moulding of the packages.

Production of the structural packaging is carried out by Free Pack Net exclusively through outsourcing agreements.

Logistics

Logistics in Free Pack Net can be divided into three subactivities:

1. Tracking (using IT) and the planning of the reverse logistics network involves monitoring the journey made by each piece and also provides the preliminary detailed planning for the eventual reverse logistics network operations. This activity is of high strategic importance since it needs correct preventive

programming of the transportation networks and tracking methods for every product, and is carried out using an elaborate information technology system which ensures the package journeys are monitored smoothly and ensures the support of the operating structure. Tracking and programming is carried out internally using an IT system.

2. Delivery: the factories making the packaging deliver them to Free Pack Net's sorting centres (effectively these are logistic centres for preparation and reconditioning), that are located throughout Europe. Here they prepare the kits according to Free Pack Net's production plan (and thus according to the delivery plan to the domestic white goods factories) and next send them to the producers of domestic white goods. The domestic white goods manufacturers pack the electrical appliances and inform Free Pack Net, via the IT system, of the location and sales outlet to which they have been sent. In this way it is possible to track each product in the market. When the product arrives at the final consumer's house, the person installing the appliance (usually an employee of the sales outlet) recovers the packaging, closing it into a small suitcase and takes it back to the sales outlet. If, however, the consumer buys and installs the appliance themselves, the packaging must be returned to the sales outlet where in the future, the introduction of a guarantee deposit of €10/15 per packaging is foreseen; the adoption of such a small guarantee deposit is possible due to the limited industrial cost of the packaging.
3. Collection and reconditioning: once the packaging is brought back to the sales point, Free Pack Net intervenes using external companies specialized in the supply of logistic services to take the suitcase back to collection centres and then on to the sorting centres. Within these organizations, the logistics partners will clean and recondition the packaging, and reassemble the kit to send back to the domestic white goods producers according to instructions received through Free Pack Net's IT system.

The above takes place for the first 20 uses of the packaging. On the 21st cycle, the packaging has finished its useful life, and is sent by the sorting centres back to the factories that made the packaging. We then move on to "Manufacturing 2".

Manufacturing 2: packaging regeneration

This is the activity of regeneration/reproduction of packaging after 20 uses. The end-of-life packaging follows a variation in the logistics circuit: after arriving at the sorting centres, the shells are sent back to the businesses that produced them, where they are ground up and the packaging is regenerated with additional new material. Later, the regenerated packaging is sent back to the sorting centres which prepare the kits and then send them to the domestic white goods producers, restarting the circular flow.

Benefits

Free Pack Net's packaging has a number of advantages for all the players operating in the domestic white goods sector; it also has environmental benefits.

In market testing, the total rental costs of the reusable packaging are less than the purchase and disposal costs of disposable packaging.

Business customers also benefit from a considerable reduction in damages caused during the transportation and handling operations as the damage have been typically reduced from 5% to 0.4%. The packaging withstands loads from storage and handling of up to 1200 kg, therefore the metal structures of the product could be considerably lightened, thereby saving raw materials and industrial costs and providing the opportunity to obtain even more efficient product energy categories. *"The dishwasher must be designed to wash plates and not to withstand loads of 1200 kg"* (Massimo De Santis, President and Managing Director of Free Pack Net).

Lastly, it is also appropriate to consider the benefit for the image of the businesses that adopt the system. The environmental issue is used more and more by businesses to satisfy the needs of its customers, who nowadays show a greater sensitivity and awareness towards environmental issues. If traditional packaging materials such as polystyrene, stretchable plastic film, and cardboard are not being used, the volumes of waste created by the disposal of these materials is totally eliminated; for example it has been calculated that in the Lombardy region of Italy alone, every year 1600 tonnes of expanded polystyrene is

disposed of from packaging of domestic white goods.

In 2006, Free Pack Net commissioned an Institute to quantify the environmental benefits when the current disposable packaging was compared to reusable packaging and against various environmental indicators.

For each indicator, reusable packaging in polypropylene had advantages that ranged between 70% and 95%.

The energy consumed in the life cycle of reusable packaging for a washing machine (e.g. production — used 20 times — final recycling) was 85% lower than that consumed in the life cycle of 20 different types of similar traditional packaging.

This represents a saving of approximately 39 barrels of petroleum for every 1800 washing machines produced. This becomes around 1 million barrels a year for the entire annual European production of domestic white goods and around 4 million barrels a year for 60% of the world market for domestic white goods.

The final consumer could also benefit from the purchase of more efficient domestic white goods (after a product redesign) that consume less energy and therefore offer a reduction in domestic energy utility costs for consumers and for society as a whole.

Case Study 5: Chicago Climate Exchange

The Chicago Climate Exchange (CCX), a US corporation, is a voluntary greenhouse gas (GHG) reduction and trading system involving emission sources and emission offset projects worldwide. It started trading operations in 2003 and in 2005 launched the European Climate Exchange (ECX), an exchange operating in the European Union Emissions Trading Scheme.

CCX works on the basis of a cap and trade programme where the member organizations agree to reduce their emissions by a certain level each year.

The regulatory bodies first set a cap or limit on the amount of the pollution or environmental degradation allowed in a region.

Then the member companies that reduce their emissions below their set limit receive emission allowances/permits which they can bank or trade/sell to companies that have not been able to meet their targets at a market price.