



Editorial



Main Drivers for Successful Development of Packaging: Analysis, Legislation and Systematic Approach

Assoc. prof. dr. Visvaldas Varžinskas

*Centre for Packaging Innovations and Research,
Kaunas University of Technology, Kaunas, Lithuania
E-mail: visvaldas.varzinskas@ktu.lt*

Around 70% of packaging is used for food and drinks, but packaging is also needed for healthcare, beauty products, chemicals, clothing, electrical and electronic equipment to ensure they stay in an acceptable condition from manufacturer to consumer. Today's global packaging industry is valued at over \$400 billion, roughly broken down into 36% for paper and board, 34% for plastics, 17% for metals (steel and aluminium), and 10% for glass, the remainder being made up of materials such as wood and textiles.

At first sight, it may appear that very different things have to be combined in packaging development and design: on the one hand packaging must protect the product, be robust and tight throughout the product supply chain, on the other, it has to be easily opened for the use of the product; information on the packaging must be clear and readable while the packaging manufacturing costs and an adverse effect on the environment must be minimised. A wrong decision made on the type and amount of packaging material, transportation and other aspects may adversely affect the product quality and cause economic, social and environmental harm. For these reasons different specialists – engineers, technologists, designers, logistic specialists and others – must be involved in packaging development and design work. Packaging development and ecodesign methodologies are needed to facilitate the work of these specialists. Different methodologies of packaging development are available at European level, workshops and training courses are held for packaging designers and companies, and research is done in search of new and better techniques for packaging development. A number of research studies on packaging development and manufacturing issues are conducted for different product groups in the Centre for Packaging Innovations and Research (KTU, Lithuania). Unfortunately, the scope of the research is not as broad as it might seem in view of the packaging market size and needs. Due to a variety of solutions and complexity of integrated assessment, this issue, meanwhile, is addressed through different stages and by means of different methods. No common, widely accepted and described methodology of packaging development so far has been developed, and packaging designers or packaging development staff seem to be using their personally developed techniques or they simply make decisions intuitively. Questionnaires, lists of factors to be taken into account by packaging developers and designers before making a decision are often used in practice.

Whatever we are doing, our activities and the materials used to undertake these actions, are governed by some form of legislation. Although at times this may seem inconvenient, it could be argued that it is impossible to have an effective society without some form of agreement as to what is to be acceptable and what is not.

A Survey on Compliance with the Essential Requirements in Member States (made by the European Commission) defines that the EU Packaging and Packaging Waste Directive (PPWD) seeks to harmonise national packaging legislation, with a dual goal of preventing/reducing the environmental impact of packaging and packaging waste and ensuring the functioning of the internal market to avoid trade barriers and distorted competition. Essential requirements (ER), provisions laid out in the PPWD, set out the criteria for packaging to be established on the market, in relation to minimisation of weight and volume, minimisation of dangerous substances, and reuse and recovery of packaging.

Member States should not impede placing of packaging on the market which complies with the directive. Essential requirements are defined in Article 9 and Annex II of Directive 94/62, and can be summarised as follows:

- packaging weight and volume must be reduced to the minimum necessary for safety, hygiene and consumer acceptance of the packaged product;
- dangerous substances and materials must be minimised as constituents of packaging with regard to emissions from incineration or landfill (Article 11 lays down specific limits on named heavy metals);
- if reuse is claimed, packaging must be suitable for that purpose as well as for at least one of the three specified recovery methods, i.e. material recycling, energy recovery, or composting/biodegradation.

In the Directive on packaging and packaging waste the following definition is used: “Packaging shall mean all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer. Non-returnable items used for the same purposes shall also be considered to constitute packaging.” This definition enumerates the key functions of packaging; therefore, many researchers think that packaging development and design should start from the analysis and prioritisation of packaging functions. Packaging should first of all meet the basic functions, namely protection, transportation and information. Packaging is often called a ‘silent transmitter’ and actually this term fits the entire packaging systems (primary, secondary and tertiary packaging). It means that packaging presentation and design are as much important as the direct functions of packaging related to protection, grouping and transportation.

Another precondition of successful development of packaging is the consideration of the entire packaging supply chain. It is a rather complicated process because in each stage of the supply chain there might be different requirements and conditions that have to be combined. Strategic and tactical functions of packaging, logistics, the level of damage to packed products, graphic design and printing technologies are detailed in the packaging chain. There are many players and connections in the packaging supply chain, the requirements and regulations for packaging management and related information are not always clear, there are many uncertainties. Packaging supply chain is inextricably linked with the product supply chain, where there are more players, connections and requirements. The entire packaging life cycle should be also considered in terms of environmental impact of packaging, and solutions to reduce the adverse effect of the packaging system should be sought.

The packaging development and design model based on the integration of systemic approach and analysis of the main functional criteria can be successfully applied in practice in order to find effective and fast enough packaging development, design and improvement solutions. The product and packaging concept may be further evaluated and developed in environmental terms by doing a lifecycle analysis. Further development, however, would involve additional time costs. Therefore, packaging developing model may be improved by integrating the most important environmental aspects into earlier design stages, e.g. analysis stage. For instance, packaging reusing or recycling possibilities can be evaluated in the stage of selection of packaging material.

As it has been mentioned earlier, the main packaging functions, which are the starting point for packaging design, are product protection, distribution/transportation and communication. Product protection is still the main function. In the design process of packaging, the ideas for product protection are generated first, and their compatibility with the set goals is checked. The ideas of the first design cycle are further developed, analysed, and solutions for distribution system and information are added. The solutions and ideas are evaluated against the set goals and criteria until the final product and packaging concept are developed.