Hybrid Media on Packages

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Abstract

The packages are expected to carry ever more information in a limited space. One solution is hybrid media, i.e. printing intelligent elements on the packages. The aim of this study was to find the best way to produce additional business to the value chain of packages via already existing technologies for hybrid media.

The approach included a technology survey about 2D applications, interviews with industrial experts from the package value chain, two industrial case pilots with user studies and a study tour to forerunner companies in Japan.

Hybrid media can give benefits in form of cost savings, new business opportunities, additional value to already existing business and increased customer loyalty to all players in the value chain. Available hybrid media technologies are 2D bar codes, digital watermarks, image recognition, fibre matrix, RFID tags and magnetic codes.

Pilot tests and user studies showed that additional hybrid media service should include detailed product data, recipes, nutrient need, user instructions and matching of user demand. Obstacles for use are costs, time consuming and complexity.

In Japan mobile barcodes are part of everyday life, well known to consumers and used on flat rate basis. The introduction was from the beginning based on consumers' needs, not on early profit. Today it operates on a win-win principle with benefits for all the players in the value chain and several traditional printers have created completely new service concepts for their customers.

Keywords

Hybrid Media, Packaging, Printed Functionality, Business Models, User Studies.

1. Introduction

The role of the packages as a communication media is increasing and they are expected to carry more information and to give additional value instead of just being a cover for the product. On the other hand, the surface area of the package available for additional information – useful or entertaining – is decreasing as more space is needed for compulsory information set by legislation and authorities, and by e.g. versions in different languages.

Hybrid media, i.e. the integration of printed and electronic media, is one way to increase the amount of information applicable to a package. In its simplest form hybrid media includes printing of a 2D code on a package, reading the code with a mobile phone equipped with a camera, and access via the interpreted information to an Internet address to receive additional information. However, hybrid media may also have a wider meaning like interpreting an intelligent printed element, like a code, an image, a fibre structure, active particles etc., by a reader giving access to an electronic service or additional information.

The aim was to clarify the opportunities in hybrid media for the packaging industry and to find the best ways to produce additional business values. The project concentrated on existing exploitable technologies and analysed them from the aspect of applications, services, business potential and consumers' attitudes. The project resulted in a generic analysis of applications, where hybrid media offers additional values for the players in the value chain.

2. Research methods

The work started with a technology survey with the objective to analyze available hybrid media technologies and their differences. The technologies under study were mainly limited to optically readable. Camera phones were considered as a primary reading device. Also code contents were analyzed.

More than 40 industrial experts from 20 companies in the package value chain were interviewed. The companies represented manufacturers of raw materials, package manufacturers, printers, brand owners, technology providers and vendors, retailers, logistic companies, advertising agencies and consumers. The themes of the interviews were the position of the company in the package value chain now and in the future, new opportunities for the company and the company's need to communicate with the consumers.

The purpose of the case studies was to simulate an actual hybrid media service implementation process without delivering the packages to consumers through retail stores or similar delivery channels. The packages were used for individual consumer interviews in controlled environment. The case study concepts were defined based on rough ideas collected from companies during interviews.

Consumer studies with the pilot services were performed with four consumer groups. Each group consisted of ten persons and represented different ages and educational levels. The groups were balanced in respect to gender. The aim was to find out which services were of interest to the consumer, what ties the consumer to the brand, opinion about hybrid media, suitability of hybrid media in the cases, functionality and obstacles for use.

The international state of the art of hybrid media in packages was evaluated with special emphasis on additional services, information, amusement and games. Finally, industrial pilots including services based on 2D codes were developed and new business models for these services were outlined.

3. Results

Based on company interviews the general package value chain was defined (Figure 1) together with the information flow between different parties.

The package already acts as an information carrier, the legally required information is huge and "excess" codes waste surface area from a package that should be as attractive as possible. The brand owners accept a rise in price to reach visibility.

Hybrid media is used to reach cost savings, new business and additional value to existing business. In the customer interface it may create loyalty, information and additional sale. Motivating the customer to use it is essential. The brand owner can get valuable information about the using context.

Applications in logistics give the fastest pay-back. The future role of logistics may include managing the entire business chain and minimizing storing at the retailer. In valuable products RFID tags will be used.

Available hybrid media technologies include 2D bar codes, digital watermarks, image recognition using fibre matrix, RFID tags and magnetic codes. These all can be used for hybrid media services in packages although dependent on service type. RFID tags and magnetic codes are especially suitable for logistics and security applications. For consumer applications, 2D bar codes and digital watermarks are ideal as they are inexpensive to produce and the codes can be interpreted with a camera phone.
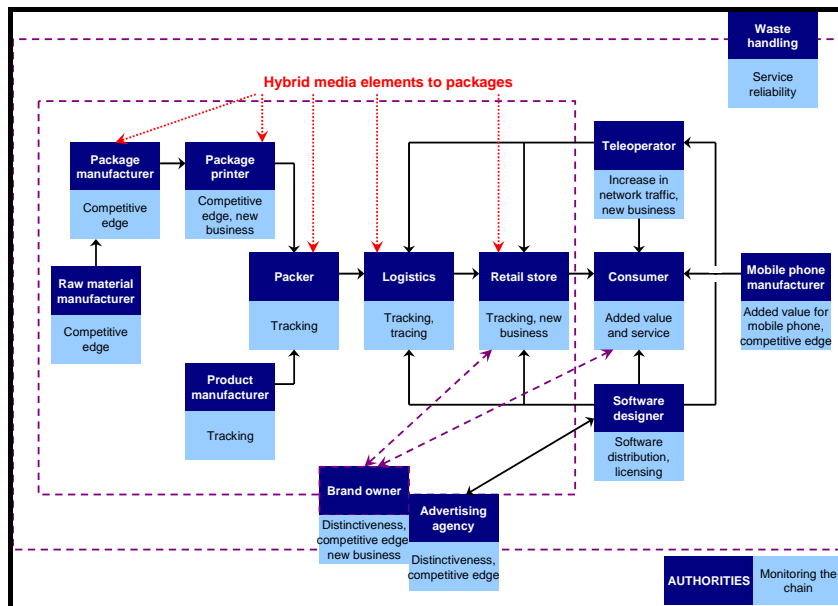
Figure 1. *Package value chain with potential parties who could add the hybrid media elements and benefits that hybrid media could bring.*

Consumers can read the data content of a code symbol by camera phone equipped with suitable software. The data content is typically a link to a web service giving additional information about the product or access to some kind of contest etc. A 2D-code requires space on a package but on the other hand methods for customizing the code symbol have been developed so that it would better match the appearance of the package.

In Japan hybrid media has been utilized since 2003. In Finland the first hybrid media service was used in summer 2004. During 2008 several services have been introduced in several countries in Europe, Asia and Americas. The services have mostly been attached to publications, advertisements and business cards, but also in the packaging industry some services have been tested. The technology has been globally established during the recent years and consumers are becoming familiar with it.

The lack of standardization, especially with the code content, limits the use of hybrid media technologies. Hybrid media is still a technology under development and currently it has a risk of conflicting standards that can complicate its use. In order that hybrid media would become a success story, different parties should be able to count on that the basic technology will remain unchanged.

The objective of the technology pilots in the project was to 1) produce demonstration packages and services for consumer studies and to 2) precisely report how an example hybrid media service is implemented. The technology pilots were designed to give information on how willing consumers are to use hybrid media services as well as what are consumer opinions on usefulness, functionality and ease-of-use of these services.

The results clearly showed that grown-ups tend to be in a hurry when shopping and that any service that eases their shopping would be useful. Such a service should work only on-request. For some users the data transfer fee is an obstacle for using this kind of services, but for many users it is important only to know the magnitude of costs.

Figure 2. *Coffee and cereal packages with hybrid media codes used in the pilot tests.*

Based on the user studies the service could include:
- Recipes and shopping list based on user's choices. For one day or for whole week depending on user's choices.
- Service that tells the user how much of daily need of each nutrient he has had after each meal/snack. Service could recommend healthier choices if requested.
- Ideas of new ways to use the product.
- Very detailed information of the food stuff like the origin of each component.
- Information on how well a new product meets the demands set by the user. The criteria could be defined in a user profile of the service. The most common restrictions in diet are due to allergies but some users also want to avoid certain ingredients (e.g. aspartame, fat or specific e-numbers) for other reasons.

The biggest obstacles for using code were:
- The costs; the users are not willing to pay for additional information of the product. The data transfer fee was not an obstacle for highly educated users or for users over 40 years old, if the service was found useful.
- The mobile phone or the application; the users found their own mobile incapable of using the services and they were lazy to download applications, while their experience of downloading was sometimes troublesome.
- It is time consuming; users are not willing to spend time on codes. Especially this concerns the time spent shopping groceries.

Things that would promote the usage of the codes:
- Young people find it frustrating to write text messages, codes are simpler to use.
- Users tend to have the mobile available somewhere near.
- Middle-aged users have problems in seeing small text.

An analysis of business models associated with using hybrid media on packages was carried out. The aim was to discover the different solutions for taking advantage of hybrid media and the requirements that the implementation of these solutions place on the way the firms do business. For the purposes of this study, business models were understood to mean the logic behind how a firms aims to generate revenue by creating value for its customers and the way in which the firm organizes its resources in order to do so.
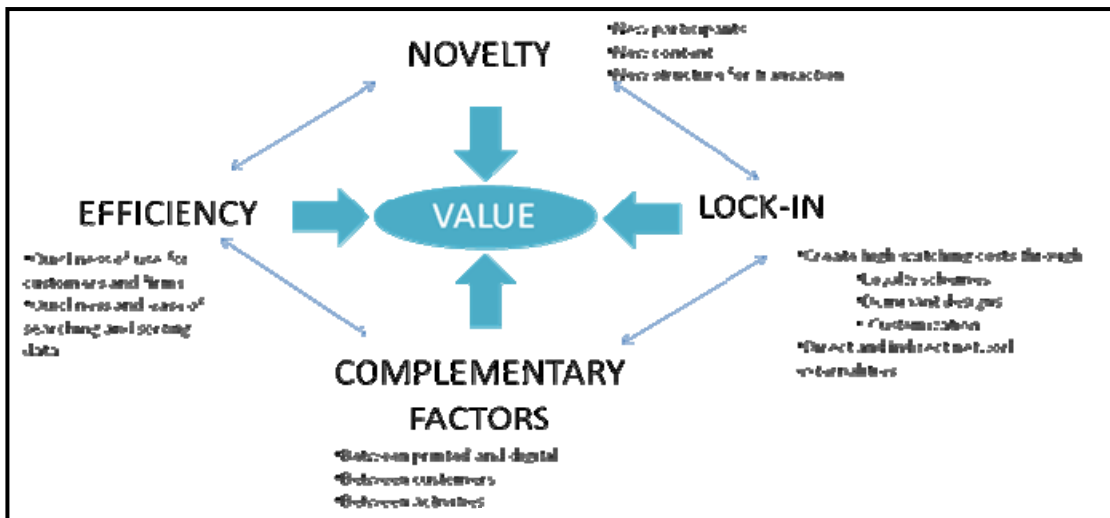
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Figure 3. *A value driven model for hybrid media solutions.*

A two-tiered approach was undertaken that included interviews in Finland with managers of firms about the benefits they envision hybrid media could provide and how they would organize their business to take advantage of these benefits, as well as interviews with firms' management in Japan, where hybrid media solutions had been successfully integrated into products and firms were able to benefit from using hybrid media.

The interviews in Finland revealed that some of the representatives of the Finnish firms were extremely cautious about integrating new technology into their existing offerings. Their concerns seemed to be mostly with the added costs and high risk associated with undertaking a new type of solution. While many interviewees in Finland seemed convinced that hybrid media solutions could offer added value to their customers and therefore be worthwhile for the firm, they were afraid the changes required in their existing business models to incorporate the new solution would be substantive and possibly detrimental. Many firm representatives said they would be more likely to be willing to take the risk once other firms had shown that hybrid media can be used successfully.

Meanwhile, the Japanese interviewees seemed convinced that the business model of the firm should always be aimed at providing maximum value for their customers, and that in order to do this, they must be able to incorporate new ways to deliver value into their existing business model. They appeared to view the integration of hybrid media into existing products as merely an added component to their offering and not something that requires a total overhaul of their business model. Their views also seemed to be in stark contrast to those of their Finnish counterparts regarding the time a firm should wait for positive returns before terminating a new venture. While some of the Finnish interviewees were keen on seeing a clearly defined ROI analysis that could be conducted after a given period time, the Japanese appeared to be more willing to provide new services even without a clear and identifiable revenue stream. It was enough for them that they judged the new services to be of value to their customers.

4. Conclusions

Hybrid media has proven to be an efficient way to increase the amount of information on packages. Intelligent printed elements, readable e.g. by mobile phones, can be used for giving additional information in different languages about the product, raw materials, manufacturing process, advises to use, recipes, restrictions and regulations. It also enables feedback from customers and additional service like entertainment, special offers and advertising. The same elements can also be used to send information between the different partners in the value chain.

In Japan hybrid media has been used generally in packages since 2003. The lack of standards has been the main obstacle for international utilisation of the hybrid media technology. Technology pilots were carried out for consumer studies and to find the best way to implement hybrid media service. It was found that

consumers are most interested in the product itself and want to find more information about it via the intelligent elements. However they need the software ready installed in their mobile phones, and they are also concerned about data transfer fees.

The additional hybrid media services need new business models to become profitable. Examples of successful campaigns and service business can be found in Japan, where the brand owners often see the additional services as a marketing tool.

Acknowledgements

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