Improving Online Visibility and Information Sharing Through the Culturalisation Process of the Product and Website

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Abstract. Product manufacturers can improve their online visibility through Search Engine Optimization (SEO). This process allows product manufacturers to make their products visible on search engine results pages by creating a bidirectional channel of information between the company and its customers. This gain in visibility drives traffic to the company website, allowing them to present their latest product innovations to potential future customers. Moreover, once this online contact channel is established, stakeholders can obtain the voice of their customers. Nevertheless, the SEO process is often long and uncertain because search engines are not transparent in their ranking process. Frequent algorithms updates can also make SEO actions inefficient. Furthermore, in a cross-cultural context, ranking well on search engines results pages is not enough. The website must also be properly designed according to cultural differences to prevent customers from leaving the website. Finally, processes permitting website adaptation for search engines and cultures are not sufficient if the product is not "culturally" acceptable. The company needs to share the proper informational product content to meet the needs of customers from different cultures. This paper considers the product and the website as a pair and proposes an approach that assists stakeholders and webmasters during SEO and culturalisation processes. The objective is to obtain the voice of the customers through the creation of a bidirectional information channel between a company and its customers.

Keywords. Culturalisation process, information channel, online visibility, search engine optimization (SEO), decision-making

Introduction

Today, product manufacturers are under increasing pressure to reduce costs and product life cycle, as well as their design and engineering cycles [1]. They also have to maintain proximity to their customers in order to continually meet their needs. The arrival of the Internet in the 1990s contributed to the development of globalization and allowed product manufacturers to engage and share information about their products with potential customers through their website worldwide. An increase in the number of websites and strong global competition has led search engines to play a major role

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on the Internet. For that reason, in order to establish an online contact channel with potential customers, international product manufacturer websites must be visible on search engine results pages for the company's targeted country. Indeed, an innovative product presented on a website which does not appear on search engines will not lead to the creation of an online information channel. Moreover, even those websites which can be found on search engines will not retain potential customers if they are not adapted to the targeted culture. In these two cases, the stakeholders will not be able to establish an online information channel with potential customers, and it will be impossible to obtain the voice of the customers (VoC). To avoid these problems, the product manufacturer has to control its online visibility and the culturalisation process. The objective is to make the website become a real interaction node.

The SEO process allows for the creation of a bidirectional channel of information between a company and their customers by increasing the visibility of their website on search engine pages. By using certain techniques in the source code, the website structure and its environment, SEO can improve search engine ranking. However, SEO results take time, often several months to obtain a first-page search engine ranking. In reality, Web users would rather reformulate their query than look at the second page of search results [2]. SEO results can also be uncertain because search engines are not transparent in their ranking process. Webmasters constantly need to test and to evaluate their actions to reach their objectives because the SEO process is not clearly formalized [3]. Moreover, global competition has forced product manufacturers to adapt their communication in order to be understandable in foreign countries. Informational content translation has become common, but website structure, content presentation and user interface are rarely optimized, leading to misunderstandings between cultures [4]. Finally, the webmaster will have to implement efficient SEO actions on the website while adapting the user interface to multicultural users. To be efficient, this work has to be completed with the proposition of a "culturally" acceptable product in order to meet the customers' requirements. This is why stakeholders and webmasters must be assisted in their decision-making during the SEO process and the culturalisation process of the product and website. The development of an approach to improve online visibility and information sharing of product manufacturers in a cross-cultural context is necessary. This paper describes the development of this approach.

This study is structured as follows: Section 1 presents methods for online visibility enhancement. Section 2 presents methods for website culturalisation. Section 3 describes methods for product culturalisation. Section 4 presents the culturalisation process of the product-website pair. Section 5 shows the developed approach. The conclusion presents and analyzes our findings.

1. Online visibility enhancement

Online visibility can be enhanced by using Search Engine Optimization (SEO). It is the process of improving a website's ranking in search engine results pages. Companies can outsource the SEO process. In this case, the involved human actors are the manager and the SEO practitioner [3]. Nevertheless, better cost-effectiveness, deadlines, confidentiality and knowledge can lead product manufacturers to insource the SEO process to their webmaster [5]. The SEO process allows a website's search engine results ranking to be improved by optimizing "on-site" and "off-site" criteria. Among the on-site criteria are those affecting the content of Web pages. Text content must be

sufficiently dense because search engine algorithms use keyword detection to rank websites. It is better to use more text than images, thus allowing search engines to easily understand the content of the information. Important keywords also have to be repeated in the full text and in <HTML> tags, as the <TITLE> tag and <Hn> tags. <Hn> tags structure information content and the presence of <H1> and <H2> tags is recommended [6]. The text content must also be sufficiently qualitative; it must present the right content of information. Even if the website has a good ranking, the Web user has to find the information she or he is looking for. If not, the Web user could leave the website. Click-through rate (CTR), session duration and bounce rate allow companies to measure the quality of information on a website by measuring visitor behaviors; search engines also use these criteria to rank a website [7]. Among off-site criteria are those affecting the website environment as the number and the quality of backlinks, and the presence and interaction on social media. The problem is that the SEO process is uncertain; results take time, and the process is not clearly formalized. As a result, the webmasters constantly need to test and evaluate their actions to reach their objectives. The SEO process is considered a complex problem [8]–[10].

2. Website culturalisation process

Due to their nature, websites reach a global audience. Thus, to engage and to keep customers from different countries, the product manufacturer's website must be properly adapted. The translation of the information content is not the only objective; the website must also be adapted to the targeted culture. Several authors did studies on cultural dimensions. Hofstede distinguished six dimensions: *power distance, uncertainty avoidance, individualism vs. collectivism, masculinity vs. femininity, long-term orientation vs. short term-orientation and indulgence vs. restraint* [11]. Trompenaars highlighted seven cultural dimensions: *individualism vs. communitarianism, universal vs. particular, neutral vs. affective, specific vs. diffuse, achievement vs. ascription, sequential vs. synchronic, internal vs. external* [12]. Hall proposes three cultural dimensions: *low vs. high context, proxemics/personal space, monochromatic vs. polychromatic time* [13]. Although these authors received some criticisms concerning their studies [14], they are the most cited in literature touching on cross-cultural aspects. In this way, several authors [15], [16] tried to link the previously cited cultural dimensions to a website's technical characteristics (e.g., image-to-text ratio, information structure, use of color, etc.). A framework linking cultural dimensions to website characteristics was developed [17]. Table 1 presents an extract of this framework to which we added the influence of website characteristics on SEO.

Table 1. Impact of website characteristics on SEO and cultural dimensions, on the basis of [17].

Cultural dimensions	Low level	High Level	Impact on SEO
Individualism vs. collectivism (Hofstede)	High image-to-text ratio	High text-to-image ratio	Yes
	Colorful interface	Monotonously colored interface	No
	Links to locals website	-	Yes
Power distance (Hofstede)	Data do not have to be structured	Structured data	Yes

	Long pages with scrolling	Limited scrolling	No
Uncertainty avoidance (Hofstede)	Presence of an internal search engine	-	No
High and low context (Hall)	Lower proportion of pictures and more detailed information	High proportion of pictures – Limited amount of information	Yes

As presented in Table 1, some website characteristics have an impact on SEO. This impact can be positive (e.g., a website with structured data) or negative (e.g., a website with more images than text). In this case, the culturalisation process can disturb the SEO process. Finally, to engage and keep customers on the website, the webmaster must ensure the website's culturalisation process does not disrupt the online visibility enhancement.

3.   Product culturalisation process

The Internet allows product manufacturers to propose their products to customers worldwide via their website. However, if the product itself is not "culturally" acceptable, customers will not be satisfied and will leave the website. Indeed, a product created in a particular geographical location cannot simply be transferred to another without any modifications [18]. The first contact between end users and a product is the product's style. The product must be visually attractive [19]. For example, Audi states that more than 60% of car buyers consider the car's style as most influential criteria in their decision [20]. This statement is true for many types of products [21]. For instance, the aesthetic features of a tennis ball in the customer perception, are more important than its technical aspects [22]. The notion of visual brand identity [23] is a key concept for a brand product and for the customer's perception of the brand. That means that the customer can recognize the brand by reoccurring product features though modified from the previous ones [24]. Visual brand identity allows products to produce certain explicit and implicit ideas [25] for the customers, including feelings and emotions. These morphological features of the product are not unique criteria of dialogue between the product and the multicultural distributed customer. The perception of the "green" aspects embodied in a future product has emerged as a new criteria in some cultures [26]. Understanding how the customer perceives the product and how the customer dialogue with the product is an important research question.

4.   Culturalisation process of the product-website pair

This study considers the product and the website as a pair because international product manufacturers must adapt these both elements to the targeted culture in order to create a bidirectional information channel between them and their customers. Figure 1 presents this concept:
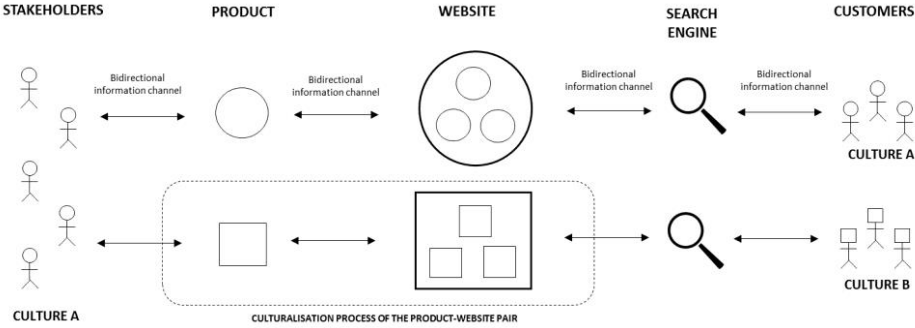
Figure 1. Culturalisation process of the product-website pair.

The bidirectional information channel between the product and the website requires converting product specifications into "qualitative" information that should be added on the website. The quality of information is critical, because irrelevant content, inaccurate or missing information about products leads to a high bounce rate and low session durations [27]. Thus, when reading product descriptions that do not correspond to their culture, potential customers tend to leave the website in question. Finally, the culturalisation process of the product and website must also be associated with the SEO process in order to enhance online visibility. Figure 2 presents different situations and highlights the best path to create a bidirectional information channel between the product manufacturer (represented by stakeholders) and its customers.
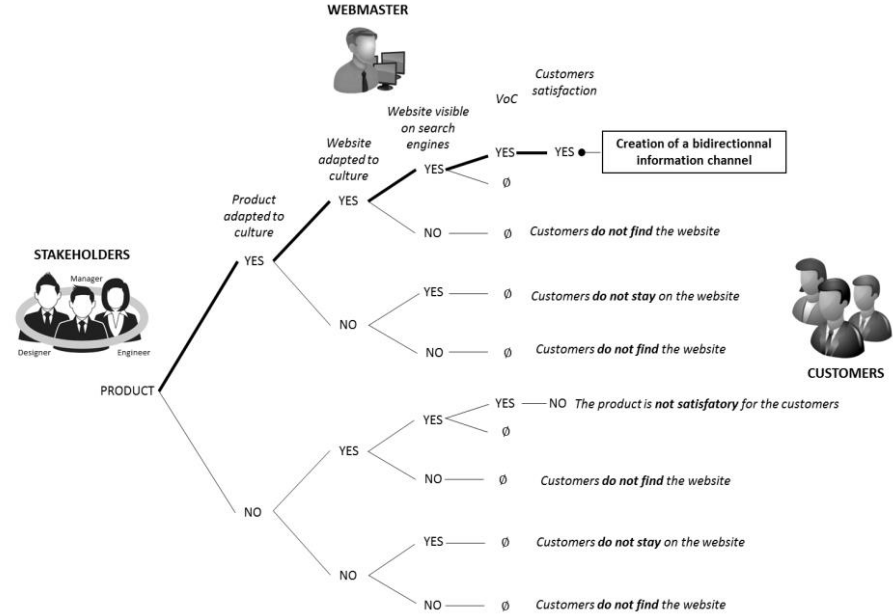

Figure 2. Creation of a bidirectional information channel.

5.   Proposition of an approach

An approach that assists stakeholders and the webmaster during the SEO process and the culturalisation process of the product and website is necessary. Indeed, these processes are complex and the proposed solutions can sometimes be contradictory.

5.1   Synectics laddering

Laddering is an interview technique where the interviewer uses a limited set of standard questions to elicit respondent requirements. This technique assumes that the respondent's knowledge is organized as a polyhierarchy and that this knowledge is categorical. This interview technique allows the interviewer to find subconscious motives [28] because cultural factors are difficult to catch and are not explicit. We have adapted an existing approach that uses the laddering technique to elicit customer requirements [18] to build our approach. We called this adaptation "synectics laddering". Contrary to the standard laddering technique, the *verbatim constructs* in synectics laddering are only proposed by domain experts. We consider that the culturalisation process depends on accurately eliciting requirements concerning the product and website, but unlike customers, domain experts have a broad understanding of the general context and literature. For example, we saw that website characteristics have to take into account search engines but also the targeted culture; according to the literature presented in Table 1 in Section 2, the domain expert is able to elicit relevant requirements. Thus, we consider that synectics laddering is a suitable tool to elicit relevant product and website requirements.

5.2   Synectics laddering for website and product design

As with standard laddering technique, synectics laddering begins with the selection of a *seed item* by a domain expert; we decided to select the "*website*". Then, two facets relative to website characteristics were selected: "content" and "user experience". After that, we selected six imposed constructs from the literature presented in Section 2: "*information structured*", "*information homogeneity*", "*color*", "*easy to use*", "*links*" and "*scrolling*", and we proposed six verbatim constructs. The synectics laddering for website design is presented in the Table 3:

Table 3. Synectics laddering for website design.

Facet	Imposed construct	Proposed Verbatim Construct
Content	Information structured	*H1, H2 tags*
	Information homogeneity	*Ratio image/text*
User Experience	Color	*Colorful interface, monotonously colored interface*
	Easy to use	*Internal search engine*
	Links	*Links to local websites*
	Scrolling	*Long/short scrolling*

Table 4 presents synectics laddering for product design:

Table 4. Synectics laddering for product design.

Facet	Imposed Construct	Proposed Verbatim Construct
Performance of product / service	Functional	*Energy flow, material flow, information flow, input and output conditions (temperature, energy, pressure, power, force, velocity, acceleration, time, etc.), yield, precision, sensibility*
	Quality of service	*Reliability, robustness, security, life time, maintainability*
	Contingent effect	*Noise, vibration*
	Legislation	*Norms, codes*
	Use	*Users, actions*
	"Green" environment	*Energy spent, carbon, particles*
Design	Style	*Attractive form*
Ergonomic	Physical aspect	*Visual: dimension, shape, color, texture; Control: size, shape, color, texture; Information flow*
	Physical environment	*Climate, noise, vibrations, brightness, organic, contaminants*
Economic performance	Cost	*Global cost, maintenance cost, cost of service*

5.3   Identification of common characteristics

After determining verbatim constructs for both product and website, we asked 13 groups of French Master's students (4-5 people per group) in the field of business-engineering to each create a website in order to rank it on the Google.fr search engine based on a non-existing keyword: "bxtberitz". A non-existing keyword allowed us to avoid competition with external websites and limit the competition to the student groups. Each of the 13 websites had to simulate a tire manufacturer website. They also had to respect the following instructions: use the same Web platform (Wordpress) and present a new tire called *bxtberitz* including its price, composition and dimensions. All students were free to display additional information about the product and to adapt the website characteristics to the targeted audience, namely French tire distributors. In this study, the students played both the role of stakeholders and customers.

When all the websites were ranked on Google.fr, we visited them to identify website and product verbatim constructs according to the Table 3 and Table 4. This double identification (P:product and W:website) was conducted by filling in a repertory grid composed of the following verbatim constructs: W.INFOSTRUCTURED, W.INFOHOMOGENEITY, W.COLOR, W.EASYTOUSE, W.LINKS, W.SCROLLING and P.FUNCTIONAL, P.QOS, P.CONTEFFECT, P.LEGIS, P.USE, P.GREEN, P.STYLE, P.ERGOPHYS, P.ERGOENVIR, P.COST. For each verbatim construct in the grid, we used a Boolean value. For example, we used "1" for websites with a colorful interface (W.COLOR) and "0" for the others; we used "1" for websites presenting information about the "green" aspect of the product (P.GREEN) and "0" for the others. Finally, we linked these website and product verbatim constructs to the students sociocultural attributes (gender, region and background). The objective was to identify which sociocultural attributes influenced the product-website verbatim constructs. The data analysis was conducted by using the hierarchical clustering

method. It allowed us to join websites into successively larger clusters, using measurements of similarity or distance. A typical result of this type of clustering is a tree diagram called a dendrogram. Figure 3 shows the application of hierarchical clustering using the Ward's algorithm.
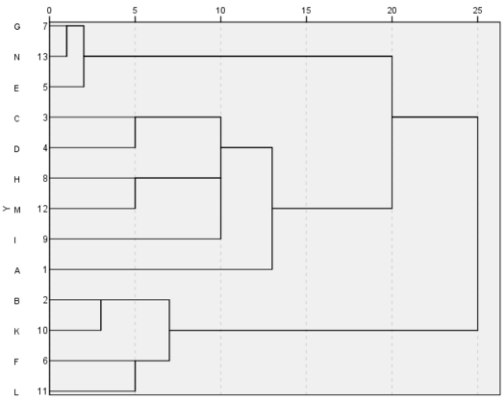

Figure 3. Dendrogram of websites and products characteristics.

The Euclidean distance was used to measure the distance between the websites. In this figure, the horizontal axis denotes the linkage distance. Thus, for each node in the tree, where a new cluster is formed, it can be read off the criterion distance at which the respective websites are linked together into a single new cluster. The dendrogram contains a clear structure in terms of clusters of websites that are similar to each other. As a result of a successful analysis with the joining method, 3 clusters can be detected for a normalized distance equal to 20. The first cluster contains websites {G,N,E}; the second cluster contains websites {C,D,H,M,I,A}; the third cluster contains websites {B,K,F,L}. The cross-clustering algorithm was used for uncovering meaningful patterns of clusters. The goal was to describe the clusters of websites either by verbatim constructs or sociocultural attributes. Figure 4 shows the results of cross-clustering.

Figure 4. Results of cross-clustering.

The diagonal blocks represent the relationship between the cluster of websites and verbatim constructs, described by the corresponding sociocultural attributes. The first group of websites {G,N,E} characterized by sociocultural attributes {region, background, gender (15 males and 1 female)} is characterized by W.EASYTOUSE, P.USE. It shows the sensibility of men for the question of the usability of the website and product design and development. The second group of websites {C,D,H,M,I,A} characterized by sociocultural attributes {region, background, gender (14 males and 6 females)} is characterized by W.COLOR, P.LEGIS. This group is characterized by people from the same colored French region; this could have an influence on the W.COLOR verbatim. The third group of websites {B,K,F,L} characterized by sociocultural attributes {region, background, gender (7 males and 11 females)} is characterized by W.LINKS, W.SCROLLING, P.FUNCTIONNAL, P.CONTEFFECT, P.GREEN, P.STYLE, P.ERGOENVIR. It shows the sensibility of women for the question of "green" aspect in the product design and development. To confirm these results we did the same study on a normalized distance equal to 8 with 6 clusters: {G,N,E}, {C,D}, {H,M}, {I}, {A}, {B,K} and {F,L}. Results were confirmed for the P.GREEN verbatim construct. From this analysis, the website verbatim constructs as well as the product verbatim constructs are presented homogeneously in different groups. They are both considered. Gender seems to play an important role in the design of the website. In addition, particular verbatim constructs as P.GREEN shows the strong interest of women for "green" considerations. It is an important finding for the design and development of websites visited mainly by women.

6.   Conclusion

Product manufacturers have to be assisted in product and website development in order to reach their potential customers on the Internet. The developed approach considers the product and the website as a pair; that needs to be adapted to the targeted customers, especially in a cross-cultural context. The study concerns a sample group composed of French people coming from different regions described by three main attributes: region, background and gender. Results present links between sociocultural attributes and product-website verbatim constructs allowing stakeholders and webmasters to build a bidirectional information channel with their customers while improving online visibility, information sharing and customer satisfaction. The study shows the relationship between product-website verbatim constructs and the gender. It shows that the long scrolling of websites, mostly designed and developed by women, is related to the sharing of functional, style, environmental and ergonomic product information. On the other hand, the websites designed and developed by men are mostly characterized by website's use as well as product's use attributes. Future research concerns the study of other product-website pairs, considering different levels of granularity of sociocultural attributes as well as verbatim constructs.

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