

# Impact of Lighting Design on Brand Image

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## Introduction

Building history reveals that companies make use of architectural design and symbols to communicate their brand identity (Messadat, 2005). Consistent design concepts for retail outlets of a brand help a company to form a uniform image to the consumer for a clear brand identity. In contrast to design parameters like colour, material and furniture, which have been established more widely in the 1960ies within corporate visual guidelines (Meggs, 1983), the aspect of lighting design is relatively new. In marketing a brand is regarded as “a name, term, sign, symbol or design, or a combination of them, intended to identify the goods or services of one seller or group of sellers and to differentiate them from those of competitors“ following the definition of the American Marketing Association (Kotler 2000). Therefore the aim of a brand communication strategy from a company as a sender is the brand image in the mind of the customer as a receiver. The so called visual identity of a brand (Kirby and Kent, 2010), as well as the actual personality of a brand (Aaker, 1997) are long known characters when it comes to conveying a certain shopping experience and to increase sales.

## Theoretical Background

From the semiotics perspective, architecture can be seen as a symbol (Nöth, 1985). Building history reveals that companies make use of architectural design and symbols to communicate their brand identity (Messadat, 2005). Consistent design concepts for retail outlets of a brand help a company to form a uniform image to the consumer for a clear brand identity. For brand classification a two-dimensional milieu studies exists, which focuses on social status and value orientation (Becker and Nowak,

1982). Additionally to the broad application of the Sinus milieu, Raffelt has developed a psycho-lexical inventory to cover the design dimensions, which determine the architectural expression as well as the relevant brand-related response dimensions (Raffelt 2011). She examined the branding literature and linked prototypical design types in architecture to brand impressions. The brand personality was intensely discussed through Aaker in which she defines it as the “set of human characteristics associated with the brand” (Aaker, 1997). Due to cultural differences in brand personality, Raffelt deduced from literature and by tests a scale for empirical studies about architectural design in Germany. A four-factor solution was judged most adequate to capture the data and explained more than 80% of the brand personality variances: Temperament, competence, attractiveness, and naturalness. Flynn observed that bright spaces appear significantly clearer and more spacious in comparison to darker situations (Flynn, 1977). Customers examine more products under bright versus soft lighting (Areni and Kim, 1994), which could be linked to attractiveness. A bright environment could also be regarded as an association to daylight and respectively to naturalness. Hence, the hypothesis is generalized for all parameters:

H1: Brightness leads to higher values for (a) price, (b) style, (c) temperament, (d) competence, (e) attractiveness, and (f) naturalness.

From the perspective of lighting technology it would be interesting, if a change in the lighting concept from general lighting to accent lighting or another type of lighting would achieve a significant change in the brand image. Due to the fact that general lighting with downlights is often

linked to low budget environments the hypothesis states:

H2: Illumination with downlights leads to lower values for (a) price, (b) style, (c) temperament, (d) competence, (e) attractiveness, and (f) naturalness when compared to wallwashing and accent lighting.

The question of efficiency plays a vast role during the design process in order to manage the investment and operating costs (Boyce, 2003). Given that brightness, in this case meaning high energy consumption, might not be an indicator for the actual prize perception in a store, the question arises that this can be also true regarding the total costs of a lighting concept. As a consequence, the hypothesis is assumed as follows:

H3: The (a) investment and (b) operating costs of a store's lighting do not correlate with the price perception.

## **Methodology**

To examine the hypothesis that changing the lighting concept is sufficient to change the brand image of a space, an empirical investigation was conducted. To obtain an evaluation of different lighting and room situations, the test participants were asked to give their judgment on light and brand issues. A seven-level Likert scale was used to quantify this stimulus and subjective reactions with "strongly disagree" and "strongly agree" at the end of the axis and a "neutral" in the middle of the scale. In total 20 items were measured. The light was evaluated via the following eight factors: Bright, Dark, Non-uniform light, Uniform light, Cold, Warm, Coloured, Colourless.

For brand classification a two-dimensional milieu study exists, which focuses on social status and value orientation (Becker and Nowak, 1982). For price index as an indicator for social status "High class" and "Low budget" are used as items. The style as a marker for value orientation consists of the items "Modern" and "Traditional".

Raffelt's value sets were reduced to the two highest values of each brand personality to enable the planned light experiment with eight scenes in an adequate time period

without fatigue. Each of the four brand dimensions by Raffelt was evaluated with two items: Smart and progressive for temperament, reputable and competent for competence, glamorous and elegant for attractiveness, close to nature and natural for naturalness. Based on four store stereotypes, four lighting concepts were designed, each related to one store stereotype. To enhance the visual perception of these spaces regarding the further process, a 3D lighting calculation program was applied to create visualizations for each space (see Figure 1). For reasons of comparison, all store stereotypes were combined with each light scene, which means 16 different scenes were generated. The simulations were embedded in an internet-based survey to allow participants from different countries an easy access to the experiment.

## **Experiment**

Considering the evolution and resulting diversity in the field interior spaces dealing with a brand image, for reasons of clarity and expense, the study was narrowed towards fashion stores. Due to its reduction to the essence of only one identity and brand (Hassanzadeh, 2009), the paper was further confined to single-brand stores (Dirks, 2009). Based on a thorough review and analysis of the literature, four abstract store concept stereotypes, covering the main reach of store stereotypes, were created: Low Budget, Colour, Black Box, and Minimalism.

The lighting for the low budget stereotype was based on a uniform lighting design with recessed downlights to enhance a functional and simple appearance. In contrast, accent lighting and coloured projection on track mounted luminaires created effect lighting for the colour shop concept. The black box design was based on grazing and accent light by track mounted luminaires to create an intense contrast. Additionally, the minimalistic concept used recessed downlights and wallwashers for an even illumination of the surfaces.

The visualizations (800 x 305 px) were based on DIALux, using digital luminaires with included geometry and IES data format.

The sample consisted of altogether 119 people, divided in 51 for group 1 (store types low budget and colour) and 68 for group 2 (store types black box and minimalism).

## Results

For hypothesis 1 a simple linear regression analyses was calculated for each group. For group 1 brightness exists as a predictor for price and style. A high brightness level leads to a higher price perceptions;  $B(SF) = 0,568(0,169)$ ,  $Exp(B) = 0,433$ ,  $p = .002$ , adjusted  $R^2 = 0,171$ . A positive relationship can be observed for style as well;  $(SF) = 0,440(0,171)$ ,  $Exp(B) = 0,344$ ,  $p = .013$ , adjusted  $R^2 = 0,101$ . Hence, the hypothesis H1 can be confirmed for (a) price and (b) style for the group 1.

Group 2 has brightness as a predictor for naturalness. A higher brightness causes a higher index for naturalness;  $(SF) = 0,305(0,143)$ ,  $Exp(B) = 0,256$ ,  $p = .037$ , adjusted  $R^2 = 0,051$ . As a result the hypothesis can only be confirmed for (f) naturalness.

For proving the hypothesis 2 a Friedman test was carried out with Bonferroni adjustment, because a normal distribution was mainly not given. Significant differences occur for the space "low budget" for style, competence and naturalness. The "color" space has significant differences for price, style, temperament and competence. For "minimal" interior a significant difference exists for price, style, competence, attractiveness and naturalness. The "black box" type shows significant differences for price, temperament, competence, attractiveness and naturalness. As a result the hypothesis is proved for "black box" in all aspects from (a) to (e) and a counter evidence for (f) style. For "minimalism" the hypothesis could be confirmed for (b) and the contrary for (d) and (e) is proved. For "colour" the hypothesis for (a) to (d) is verified. For "low budget" the hypothesis is confirmed for (b) and a counter evidence given for (d) and (f). This analysis shows that comparing general lighting with downlights significantly affects multiple brand indexes when compared to wallwashing and accent lighting. In general the downlight

illumination leads to lower values for (b) style and partly for (a) price and (c) temperament. Higher values occur with downlights in parts for (f) naturalness.

For hypothesis 3 the calculations for the costs are based on DIN 5035 part 1, 3500 h/year as the estimated operating time for luminaires in retail lighting, price information produced by lighting companies in 2011. Due to present price levels in Germany, the price per kilowatt hour is estimated with 0.17 EUR/kWh throughout all calculations. To get to the total operating costs, the investment costs, which include interest and amortization for each luminaire and other components of 10% per year, were included as well as estimated costs for maintenance, light sources and electricity. After calculating the costs per year of all scenes separately, a correlation analysis is conducted to find out more about how and to what extent the two factors of evaluated prize perception and actual operating costs per year are connected to each other. The outcome of the correlation analysis for evaluated prize perception and actual operating costs per year with 0.205 indicates no significant correlation between both terms and thereby the hypothesis can be regarded as true. Further, no outstanding connection between operating costs and the perception of attractiveness can be found with a correlation value of costs= 0.15. Even though the light scene being the most attracting one for each store stereotype, in three of four cases is the most expensive one regarding operating costs.

## Discussion

Since the amount of research in the field of light and store design today is still scarce, this paper contributes to the limited literature testing the impact of lighting concepts on the brand image. The question of how these findings can be translated into real store lighting is dependent on the effect that a brand wants to achieve and whether the case in hand concerns a new lighting concept or an existing installation. This means that it might not always be necessary to completely refurbish a store's lighting scheme. It may be

sufficient to only replace specific light settings to make a stronger statement.

Finally, this paper can be regarded as a basis for the general impact of an aligned lighting concept towards a store's image. As a result, the findings on the perception of light in retail spaces can be used to build up more detailed or even experimental studies for each individual topic.

The results reveal that the lighting effect on the brand image is dependent on the interior design concept even though the indexes for style and temperament are consistent for all interiors. Some interior concepts show different relations for the three alternative lighting types when compared to downlight illumination. Mainly the downlight illumination is associated with lower brand index values in comparison to the three alternative lighting scenes with the exception of the naturalness index where higher values mostly occur for downlights.

The conclusion that the perceived prize perception of a store is independent of the actual investing and running costs reveals a new approach to lighting concepts in retail environments. Regarding especially the overall operating costs, a better store image due to aligned lighting does not necessarily go along with higher energy costs.

### Implications

The limitations of this thesis lay in the internet-based survey as an abstract illustration of a real architectural space as well as in the number of tested stereotypes for store concepts. The all in all 16 different variations of store concepts combined with lighting scenes do not cover all possible types of store design, but try to cover the main common ones. Further, this study is limited to fashion stores as an example sector of a vast amount of different retail spaces and environments. This aspect requires consideration for the generalization of the economical findings as well.

### Outlook

An enlarged investigation with a bigger sample group could help to achieve more

concrete findings, considering for example potential cultural differences as well as local retail trends. Moreover, future research could examine, how or to what extent the given findings are applicable to mock-ups in a real size architectural space or even to on-site installations in real store environments.

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