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Specific Applications of Weather-Based Marketing

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Abstract
The rapid penetration of new technologies in business and using them largely by consumers is a prerequisite for designing new applications for the purposes of marketing. Binding marketing decisions with big data is already a necessity which provides purposefulness, accuracy and speed of processes and tools. The interdependences between weather and the users that are surveyed and registered on the offline market are considered even more significant in designing the online set of marketing tools. The positive effects of applying weather-based marketing will generate extra interest in implementing and designing innovative applications. It is expected that a step forward will be made by the high-tech companies and those which update their marketing more actively. The article reviews current applications of weather-based marketing, the response to changes in weather and the possibilities for integrating the decisions for off- and online markets. The results of the research of weather-based marketing in Bulgaria will help to explain its condition at the moment and the opportunities for enlarging its scope in the future.

Keywords: weather based marketing, real time marketing, marketing automation.

JEL classification: M31

1. Introduction

The relationship between weather and human activity may be observed in everyday life. It may be direct or indirect, but in both cases its utilization for the benefit of businesses and consumers leads to a positive effect. While in everyday life the attention is focused primarily on the direct impact of weather changes, which undoubtedly has a certain economic value, from a scientific point of view the valuation of this impact is much more complicated, as it also takes into account the transfer effect. A review of the available marketing literature shows that a number of authors have focused their research on the effects of weather in specific business fields (Becken, 2013; Busse, Pope, Pope & Silva-Risso, 2014).

Since technology nowadays makes possible the effective use of weather-based marketing, a question of interest is whether companies are willing to use applications based on relationships and proven effects in order to make their business more successful. The impact of weather changes on emotions, consumer behaviour and purchasing patterns (Mahadevaiah, 2016) goes beyond the framework of offline marketing, and marketers are already looking for and experiment with opportunities to commercialize significant marketing relationships online. The development of new technologies for real-time marketing gives a strong impetus to the development of applications in various fields (offer design, offering, pricing, promotion, product design, etc.). Using weather data in offers to consumers is an essential prerequisite for achieving greater efficiency through increased revenue, higher average price and cost optimization. High-tech companies invest in the development of applications for weather-based marketing. The results of these endeavours are already tangible: more than 10 companies offer weather-based marketing technologies and application. However, whether their clients are interested in and familiar with such applications, and whether they currently use the applications effectively or plan to use them in the future, is a different matter.

2. Arguments for tying marketing with weather

Studies over time have demonstrated a relationship between weather and purchased volumes, weather and products bought, weather and manner of purchasing, etc. The relationship between weather and demand (Weather Unlocked) by individual product groups is most clearly observed in the food and drink, clothing and fashion, travel, hospitality, leisure and entertainment, health and beauty, etc. sectors. Studies conducted by Weathertrends360 and Weather Unlocked show the significant impact of temperature changes on the sales of many product categories and groups (Table 1).

Weekly sales increase upon a temperature rise by 1F	***Weekly sales increase upon a temperature fall by 1F***
2% soft drinks	2% soup
24% air conditioners	15% portable heater
11% suncare products	25% mousetraps
4% infant apparel	2.5% softline goods
13% hedge trimmers	+5000 units lipcare

Table 1. Impact of temperature changes on product sales

Source: http://www.weatherunlocked.com/media/1096/the-complete-guide-to-weather-based-marketing.pdf

Links are observed also between sunshine and sales, wind and sales, rain and sales, and furthermore, companies seek to determine the influence of more specific weather traits like humidity, chance of precipitation, strength and direction of the wind and so on, which have the potential for marketing development. The interest of researchers has also been focused on the effect of weather on consumer spending and willingness to pay (Murray, Di Muro, Finn & Leszczyc, 2010).

The existence of established relationships between weather, consumer behaviour and the performance of a particular business justifies the implementation of weather-based marketing. Experiments conducted by companies developing applications used to put into actual use weather data have shown distinctly positive results and effects (Table 2), which will give new impetus to investment in high-tech marketing aimed at developing the potential of companies.

Effects	***Characteristics***
Increased sales revenue (WEATHER UNLOCKED, 2014; ADWORDSROBOT, 2017)	Achieved through the variables volume and prices. Various possibilities: achieving higher volume while keeping prices unchanged; achieving higher volume at a higher price; achieving higher volume at a lower price; keeping the volume unchanged at a higher price. Part of the activities within WBM can be aimed at increasing the intensity of purchases, others at increasing the value that a consumer is willing to pay for a product in certain weather conditions.
Increase in total revenues (ADWORDSROBOT)	Opportunity to realize additional revenues from advertising, commissions and the like in a WBM environment.
Improving the efficiency of sales revenue	The use of WBM brings about positive effects on the cost and/or on revenue, which in tum contributes to the improvement of such relationships (MONK). Examples have been given of the use of WBM to achieve higher efficiency of advertising (WeatherAds).
Improving cost efficiency	
Increase in profit (FORECASTER, 2015), including per consumer	Opportunity to realize a higher profit as a result of economies of scale and higher yields.

Table 2. Real effects observed in the application of weather-based marketing (WBM)

These and other actual and potential effects (Table 3) reported by companies offering and using WBM applications constitute an essential argument for the future promotion of WBM for the business and for expansion of its scope of application.

Potential effects	***Characteristics***
Increased sales revenue (WEATHERUNLOCKED, 2014)	Achieved through management of the variables volume and prices. Various possibilities: achieving higher volume while keeping prices unchanged; achieving higher volume at a higher price; achieving higher volume at a lower price; keeping the volume unchanged at a higher price. Part of the activities within WBM can be aimed at increasing the intensity of purchases, others at increasing the value that a consumer is willing to pay for a product in certain weather conditions. This effect can be achieved on both the online and offline market.
Increase in total revenues (ADWORDSROBOT)	Opportunity to realize additional revenues from advertising, commissions and the like in a WBM environment. This effect is characteristic mostly of the online market.
Improving the efficiency of sales revenue	The use of WBM brings about positive effects on the cost and/or on revenue, which in turn contributes to the improvement of such relationships (MONK). This effect can be achieved on both the online and offline market.
Improving cost efficiency	
Increase in profit (FORECASTER, 2015), including per consumer	Opportunity to realize a higher profit as a result of economies of scale and higher yields. This effect can be achieved on both the online and offline market.
Achieving a higher average price	Achieved in several directions: automated pricing, targeted offering to segments willing to pay higher prices under certain weather conditions. This effect can be achieved on both the online and offline market.
Improved utilization of capacity and space	Attracting consumers to products/channels that correspond to the company's production and distribution capacity according to the weather parameters. This effect can be primarily achieved on the offline market.
Improved speed of the individual activities	Rapid response to any change in the weather conditions. This effect can be achieved on both the online and offline market.
Increased market share	This effect is due to the increase in sales revenue and higher marketing efficiency. It can be achieved on both the online and offline market.
Increase in traffic (online and offline traffic to specific objects)	Attracting real and potential consumers and navigating them to specific offers online and offline. This effect can be achieved on both the online and offline market.

Table 3. Potential effects of the application of weather-based marketing (WBM)

Marketing intensification aimed at increasing the speed of marketing processes and improving efficiency will continue to be the basis of innovation in the coming decades.

3. Specific applications of weather-based marketing

How companies respond to weather changes and design their weather-based marketing is a problem that is going to be ever more actively researched. Popular practices and case studies examined in various publications have been key to the development of the main applications of weather-based marketing (Table 4).

Applications	***Characteristics***
Pricing	The automation of marketing processes and activities allows for tying prices with weather traits. A pioneer in the dynamization of prices based on temperature fluctuations is Coca Cola (Haysoct, 1999): the company has developed an innovative pricing model for its best-selling drink, which takes into account the temperature measured at the place of sale. Weather-based pricing can be reasoned by three main factors – first, the shift in

	consumer demand; second, the shift in consumer willingness to pay, and in the third place the changed costs for the production and/or realization of the product in different weather conditions. Weather-based pricing models will become ever more popular in an automated pricing environment.
Product design	The relationship between product design and weather has the potential for development for marketing purposes, with a view to achieving a broader geographic coverage and creating products that can benefit from weather conditions (Skymosity). There are several major aspects of the relationship between weather and product design: "weather – product features", "weather – product range", "weather – category merchandising", "weather - product policy", etc. At present weather characteristics are actively used in the design of insurance companies and agribusiness products.
Adjusting distribution	Switching between distribution channels to reflect weather conditions allows for a more efficient distribution in general and a balance between production and distribution capacity. Another significant application of WBM can be found in the management of inventory and space.
Promotion	It is used to determine the parameters of the company's communications with regard to weather/purchase, weather/consumption, weather/cross-selling and other relationships.
Offering	Design of the offer: an example of this approach, implemented in two stages, is Dynamic Yield. Targeting according to the weather conditions at the location of the potential/existing consumer.
Service	Service parameters may be designed in accordance with the weather, in the search for balance between consumer expectations and service offered.
Event marketing	Events are highly dependent on weather parameters, and are designed and conducted bearing in mind the characteristics of the weather.

Table 4. Specific applications of weather-based marketing

4. Weather-based marketing and its use by companies registered in Bulgaria

The study on the use of weather-based marketing in Bulgaria was carried out in two stages. In the period 11-18 May 2017 a 10% sample was achieved from the survey on the use of WBM among 420 companies registered in Bulgaria (the interim results are published in a separate paper). The second stage of the study covers the period 10 August to 4 September 2017. The study was in the form of an online survey and comprises a sample obtained through the volunteer sampling method (a non-probability sampling method). With emphasis on the fact that the data have been collected through a non-probability sampling method, some significant results are shown in this paper, based on information collected in the survey.

The data collected and processed for 420 companies registered in Bulgaria showed that 61.7% of these companies believe that the demand for their products/services is influenced by weather, and 31.7% found no relationship between weather and the demand for products/services. Only 6.7% of the respondents cannot decide whether such influence exists.

The majority of the subject companies (26.7%) believe their products/services are in higher demand in fine weather, 13.3% believe that the demand for their products/services is greater in times of bad weather. Of the companies surveyed, 8.3% believe their products/services are in less demand in bad weather, and 3.3% say that the demand for their products is lower in good weather.

It is interesting to see how the moment in time is important for the business of companies that take into account the weather: the weather now, the weather tomorrow, or the weather before. "The weather now" is important for the business of 69.1% of the respondents, "the weather tomorrow" – for 52.7%, and "before" has significance for 14.4% (the total is greater than 100 because the respondents gave more than one answer).

The marketing effects of weather changes were examined by means of seven variables, the results of which are presented in Figure 1.

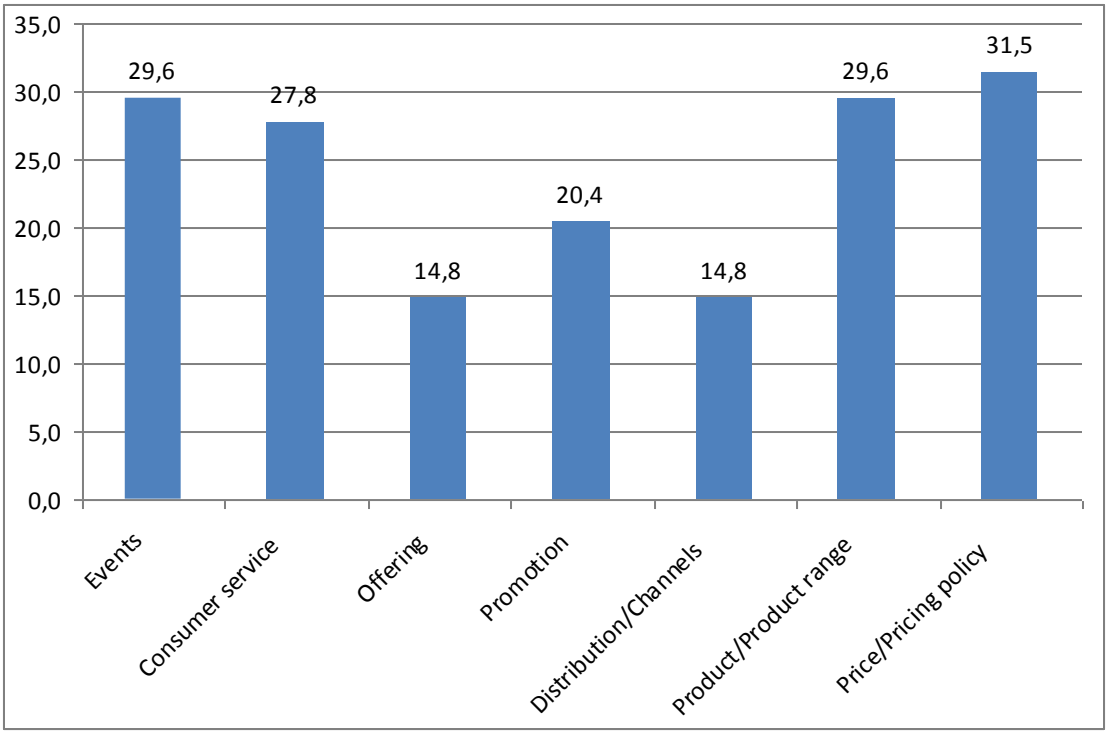

Figure 1. Distribution of respondents according to marketing exploitation of weather changes by the companies surveyed

Weather is most actively used for marketing purposes in pricing decisions (31.5%), in events design (29.6%) and product solutions design (29.6%) in the operations of companies that take weather into account.

Another interesting finding is that 80% of the respondents are not familiar with the capabilities of WBM, 16.7% have partial knowledge and only 3.3% are fully aware of them. Eight percent of the companies surveyed have used a WBM application in making online sales. The application used is widely applied and the companies have indicated that they are completely satisfied with the results. The effect in this specific case was increased marketing effectiveness. As regards the future of WBM, 14.3% of the companies intend to apply it in online and offline marketing, which too is an informative result and reflects the market specifics in Bulgaria. A comparatively small proportion of companies use automated marketing platforms (4.8%), social networks (7.1%), big data marketing (2.4%) and location tracking applications (2.4%).

5. Conclusion

Although the study of the use of WBM by companies in Bulgaria did not show high awareness and activity, the expectations for its future are positive. Weather-based marketing will continue to evolve in two directions – promotion of widely used applications in various business areas, and development of specific applications for utilization of specific opportunities. The positive results achieved by companies that offer and apply WBM will stimulate businesses to continue to invest resources in WBM technologies and applications. The relationships between weather-content search-location in the search of more effective and better targeted marketing will become increasingly used.

The aim of companies to synchronize their marketing strategy with changes in the environment will be a strong impetus to implement real-time marketing. Steps in this direction are expected to be made first by high-tech companies and by those who regularly update their marketing solutions. Information integration and more efficient use of consumer and partner data will be

among the priorities for the development of a WBM entry and the design of automated marketing solutions.

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