
MULTIFACTOR ANALYSIS OF ONLINE REPUTATION AS A TOOL FOR ENHANCING COMPETITIVENESS OF SELECTED SLOVAK TOWNS

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Abstract

The paper discusses the issue of online reputation, more specifically the ways and methods of its measurements in the selected entities operating in the local self-government sector. A thorough multi-factor analysis of reputation in the online environment of the Internet was conducted on a specific sample of entities – twenty largest Slovak towns/cities. The results of the analysis conducted on the selected part of the central European market can be effectively applied onto any market to increase competitiveness of the selected entities operating in (not only) self-government sector. Patterns and variables affecting online reputation of these entities are relatively invariable across the global Internet market.

Keywords: competition, internet, on-line reputation, reputation determinant, reputator

1. Introduction

The issue of reputation building in traditional ‘brick and mortar’ world has been known to us for centuries. Over time, business entities of different kinds have come up with a complex range of procedures facilitating reputation building [1]. Even in the situation where entities are targeted by a variety of half-truths and slander, the competent officials are aware of the fact that spoken words tend to fade away very quickly. However, written text is different from the spoken word and its consequences stay with entities for much longer time. With the advent of new communication channels, particularly the Internet, the lifespan and availability of the written text got new dimensions. This article focuses on the situation where the selected entities, in this case Slovak towns/cities, face the issue of building and maintaining a good reputation in the virtual world of the Internet. Numerous foreign and domestic authors [2-5] provide a variety of methodologies for the direct or indirect research of this issue. Some authors favour hard data, others soft data. Our analysis uses both mentioned approaches.

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2. Research problem

2.1. Reputation and the Internet

The Internet has changed the way we are thinking about reputation. What was once private is now public. What was once happening on the local level is now discussed on the global level. What was once ephemeral is now permanent. What was once trusted is now unreliable [6]. These changes happen because the Internet has modified our interaction with reputation [7]. Understanding the unique relationship between technology and online culture is a key to understand how to manage online reputation [J. Loayza, *The Beginner's Guide to Reputation Management: 8 Core Principles of Reputation Management*, <http://reputationhacks.com/guide-to-reputation-management-3-8-core-principles/>]. Those who apply off-line techniques on their Internet reputation or use off-line assumptions to solve online problems are doomed to failure. Instead, the user must be capable to understand the cultural and technical differences between the Internet and off-line world to effectively protect and improve his online reputation [8]. Walter argues that reputation is a cornerstone of one's life and business [E. Walter, *10 Tips For Reputation And Crisis Management In The Digital World*, <http://www.forbes.com/sites/ekaterinawalter/2013/11/12/10-tips-for-reputation-and-crisis-management-in-the-digital-world/#2ca443c25075>]. This means that reputation is very fragile and one mistake can sometimes cause irreparable damage. This is especially true in the digital world ruled by radical transparency and high standards of customers [9, 10]. Entities must be able to learn to communicate on social networks, follow the 'chatter' on social media and effectively respond to such impulses without harming their reputation in line with expectations of their customers. Siano et al. [11] argues that when the Internet allows consumers to share information about businesses and brands, entities have the opportunity to control information published about them. Negative comments on the Internet can quickly and severely damage image and reputation of the brand.

2.2. Reputation and the Internet

Due to the fact, that the authors of the paper belong to one of the few domestic authors dealing with the relevant field of online reputation, it can be concluded that the concept of online reputation management in our country is relatively unknown (respectively still unexplored), despite the fact that activities involved in building and protecting brand's image and reputation should be the core interest of any entity. Online reputation management (ORM in short) can be defined as a set of tools and measures implemented for the purpose of active management of virtual reputation of the entity in the course of time. The Internet is an independent world with its own rules [12]. Information spread very rapidly and if the entity does not pay attention to communication with their clients or underestimates complaints, it may have serious problems.

Reputation management in the Internet environment is often referred to as Search Engine Reputation Management or SERM, and includes several major activities [J. Sasko, *Dbáte na hodnotu svojej značky? – Did you pay attention to the value of your brand?*, <https://www.podnikajte.sk/manazment-marketing/c/1392/category/marketing/article/online-reputacny-manazment.xhtml>]:

- online monitoring of Internet users,
- communication with the public and clients,
- evaluation of results,
- crisis reputation management.

The increasing number of Internet users and the related increase in users of social networks, blogs and websites where the content is generated by the users themselves now justifies the growing importance of Internet monitoring. Entities can for this purpose use a variety of tools that continuously index new pages on the Internet and compare them with the monitored phrases such as product name, company, competitors or any other keyword [J. Sasko, *Analýza sentimentu výsledkov slovenských firiem*, <https://www.reputation.sk/wp-content/uploads/2014/02/ORMreport.pdf>].

2.3. Methods for measuring online reputation

2.3.1. Systems based on summing up and averaging

Speaking about reputation systems, the simplest solution is to sum up all the relevant positive and negative reviews. The total result related to the specific user is the difference between all positive and negative reviews. This principle is used mainly on eBay, one of the largest online markets and community with over 50 million registered users. After each transaction the buyer and the seller can give each other positive, negative, or neutral rating, which in turn adds plus or minus points (1, -1, and 0) to their reputation. Users can also leave comments. When people leave negative rating, they usually leave a comment that explains it. Although the eBay reputation mechanism is very simple, empirical results show it supports transactions between sellers and buyers. It is mainly due to the fact that sellers with better reputation are more likely to sell more. Also, this mechanism can prevent people to artificially boost their reputation with each other [13].

2.3.2. Recommendation systems

Recommendation systems are similar to systems based on summing up and averaging. Both systems collect user ratings from different communities. Nevertheless, there are also significant differences. These systems assume that different people have different taste and therefore their rating differs from other users because it is granted according to one's subjective taste. The main objective of recommendation systems, described by Tavakolifard [14] in his study, is to reduce information overload and retain customers by selecting a

subset of the universal set of products based on user preferences. In the most basic form its biggest problem are ratings for products which have not been previously identified and rated by other users. After we can estimate ratings for yet unrated items, we can recommend items with the highest estimated rating. New ratings of yet unrated items can be estimated using various techniques such as machine learning methods, approximation theory and various heuristics.

2.3.3. Sentiment analysis

Sentiment analysis or Opinion Mining may be defined as a quantification of the subjective content expressed in the text form to determine the position of a commentator or scorer in respect of a given subject. It is one of the oldest and frequently used methods for measuring reputation. In general, it can be said that sentiment analysis aims to determine the attitude of the speaker/writer towards the particular topic or the overall conceptual polarity of the document. The attitude may cover author's judgment or assessment of a particular person, emotional state or the intended emotional communication (this is the emotional effect that the author wishes to impose over the recipient) [15]. Its priority tasks include identification of subjectivity, orientation, power of the sentiment carrier, classification of emotions, sarcasm detection or various comparisons [P. Bednár, *Objavovanie znalostí v textoch - Knowledge discovery in texts*, <http://people.tuke.sk/jan.paralic/prezentacie/MZ/MZ8.pdf>]. The sequence of the measurement process begins by defining the entities in the monitored segment and its competitors in the industry. The analysis of the sentiment always takes into account first 10 results from the search engine. To limit the distortion of the results from the search engine caused by personalize search activity, influence of cookies and other factors the process uses 'proxy server' which can be, for example, anonymouse.org or any other similar site [5, p. 57]. A search phrase should always be a well-known and well established name of the research subject.

Table 1. Sentiment analysis [1].

| Sentiment/Position of the result | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Positive sentiment | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 | 12 | 11 |
| Website owned by an entity | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
| Neutral sentiment | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Negative sentiment | -20 | -19 | -18 | -17 | -16 | -15 | -14 | -13 | -12 | -11 |

One of the main factors in the process is the sentiment of the results displayed after typing key words to the search engine. Sentiment can be loosely defined as the nature of the result found after entering keywords. The results may show positive, neutral, and negative feedback. These sentiments, in order words polarity direction of the text, as well as the position at which the result is displayed will give an idea about the research subject, thus ultimately determining its online reputation [1, p. 58]. The process records the evaluation of the first 10 results in Google search. After summing up the sentiment points we

reach the final amount. That amount is then a starting factor in assessing the success or failure of companies in the particular segment. Table 1 shows the values assigned during the sentiment analysis.

2.3.4. Multifactor sentiment analysis

Comprehensive analysis requires a comprehensive approach. Using the advanced sentiment analysis it is possible to calculate the partial score presenting the power of online reputation of entities based on the nature of the first 10 Google search results. Google and its search results, however, are just one of the many ways through which potential customers can access relevant information. Multi-factor sentiment analysis [<https://www.reputation.sk/wp-content/uploads/2014/02/ORMreport.pdf>] is designed to accurately measure the overall online reputation of entities.

The methodology used in this survey uses 4 factors that speak about online reputation of individual entities.

- The first factor is an advanced sentiment analysis (ASA) for the first 10 results Google search results divided into three basic groups. Keywords are put into the search according to the following matrix: 1st group: name of the entity, 2nd group: name of the entity + the first most searched keyword from the field the entity operates in, 3rd group: name of the entity + the second most searched keyword from the field the entity operates in. The sum of the search results sentiments of the above three groups is then used for the final score.
- The second factor is the size of the audience on social networks.
- The third factor focuses on the presence of the entity on the electronic versions of major dailies.
- The fourth factor is the number of indexed pages in the search engine Google.

3. Objectives and methods

The main objective of the study is to present partial results of the comprehensive research that analysed the issue of the importance of online reputation of selected entities operating in the specific market. The study summarizes the possibilities of measuring on-line reputation. On the basis of the sample of the twenty largest Slovak towns/ cities, the study presents a complex multi-factor analysis of online reputation as a tool to improve the competitiveness of local self-government entities through identification and understanding of the background affecting the marketing communication on the virtual hyper-competitive market. The partial objective of the study was to identify basic determinants that can objectively affect the online reputation of the selected Slovak towns. The analysis was conducted in the first quarter of 2016. For the purpose of this research we used multi-factor analysis of online reputation TOR. Essentially, it is a modified multi-factor sentiment analysis.

Methodology of the multi-factor analysis of the total online reputation (TOR) brings more variability in its application on a broader spectrum of subjects than multi-factor analysis [1, p. 81]. Moreover, it also brings a comprehensive look at the reputation of the given entity relative to the total possible reputation expressed as a percentage. Methodology used in the TOR index uses n-factors.

The first step analyses the sentiment of the first 10 results on Google. As for the number of groups, the standard is at least two groups: 1st group: name of the entity, 2nd group: name of the entity + the first most searched keyword from the field the entity operates in. In any case, the number of groups is not particularly limited. Quantification is then ensured by unifying the scores into the percentage form. This is based on the assumption that within a single group the entity may receive a maximum score of 155 points – the ratio 1 point = 0.645%.

Second step identifies the determinants of online reputation, the so-called reputators. Reputator can be any determinant that can objectively affect the perceived online reputation of the entity, while its value can be quantified as a percentage. Normally these are important web pages, catalogues or social networks that can significantly affect the reputation of the entity. Given the various business fields entities operate in, reputation determinants cannot be clearly defined in advance. In terms of advantage quantification it is possible to approach individual reputation determinants in two ways:

1. Unification of partial rankings – for example booking ranks the subjects on a scale of 1-10, Google, Facebook and Trip Advisor on a scale of 1-5. For the purpose of further analysis we needed to unify reputation determinants by recalculating the percentages.
2. Calculation of reputators' competitive score - the amount of users (fans/customers/followers) the particular entity has relative to the sum of all tested subjects. The result serves as a basis for calculating the percentage of the reputators' competitive score (CS) of the particular entity.

In the third step we can calculate the total advantage of the entity's online reputation with regard to its pre-defined competitors, as follows:

Standard equation [1, p. 87] features specific determinants of online reputation and their weight. The basic reputation determinant is the ASA percentage score. The equation allows us to take into account any number of other reputation determinants. For the calculation itself it is necessary to determine the weights of individual reputation determinants which are normally determined depending on the subject and target market. If the weight of individual reputation determinants is not known in advance, the formula for calculating the overall online reputation is as follows:

$$TOR = \frac{R_{ASA} + \sum_{i=1}^n R_i}{n + 1} \quad (1)$$

where:

TOR - Total online reputation v (%)

R_i - Reputation determinant (% score according to the particular I - reputation determinant)

R_{ASA} - ASA reputation determinant (%score according to the advanced sentiment analysis)

N - Number of determinants

In this case, the value of the overall online reputation is an arithmetic average of individual indicators (partial score according to individual determinants).

Table 2. Overall (total) online reputation.

| No. | Town/ City | ASA score (%) | TCS score (%) | FCS score (%) | YCS score (%) | Number of pages indexed by Google | Population (n) | TOR Score (%) |
|-----|-------------------|---------------|---------------|---------------|---------------|-----------------------------------|----------------|---------------|
| 1. | Bratislava | 48.64 | 70.05 | 12.65 | 6.78 | 81,200,000 | 419,678 | 34.53 |
| 2. | Košice | 32.32 | 10.34 | 9.59 | 2.54 | 22,900,000 | 239,464 | 13.70 |
| 3. | Prešov | 46.40 | 0.00 | 2.74 | 0.00 | 12,400,000 | 90,187 | 12.28 |
| 4. | Žilina | 24.00 | 0.00 | 4.09 | 20.34 | 16,400,000 | 81,155 | 12.11 |
| 5. | Banská Bystrica | 24.00 | 7.65 | 5.35 | 0.00 | 12,700,000 | 79,027 | 9.25 |
| 6. | Nitra | 26.88 | 0.12 | 3.21 | 0.56 | 21,000,000 | 78,033 | 7.69 |
| 7. | Tmava | 13.76 | 2.61 | 19.16 | 3.67 | 17,700,000 | 65,713 | 9.80 |
| 8. | Martin | -4.80 | 0.00 | 3.60 | 36.16 | 1,650,000,000 | 56,053 | 8.74 |
| 9. | Trenčín | 15.36 | 0.19 | 0.57 | 0.00 | 12,400,000 | 55,857 | 4.03 |
| 10. | Poprad | 28.16 | 3.22 | 3.23 | 3.39 | 13,200,000 | 52,316 | 9.50 |
| 11. | Prievidza | 11.52 | 2.46 | 9.46 | 1.98 | 8,060,000 | 47,574 | 6.35 |
| 12. | Zvolen | 15.36 | 0.00 | 3.53 | 15.25 | 11,800,000 | 43,047 | 8.54 |
| 13. | Považská Bystrica | 3.20 | 0.00 | 4.77 | 0.00 | 485,000 | 40,569 | 1.99 |
| 14. | Michalovce | 26.56 | 0.00 | 1.58 | 0.00 | 8,040,000 | 39,510 | 7.03 |
| 15. | Nové Zámky | 15.36 | 1.21 | 0.85 | 7.06 | 4,960,000 | 38,941 | 6.12 |
| 16. | Spišská Nová Ves | 21.12 | 1.93 | 6.74 | 1.41 | 2,000,000 | 37,707 | 7.80 |
| 17. | Humenné | 31.68 | 0.19 | 4.70 | 0.00 | 331,000 | 34,186 | 9.14 |
| 18. | Levice | 16.32 | 0.03 | 1.50 | 0.85 | 747,000 | 33,977 | 4.68 |
| 19. | Komárno | 25.28 | 0.00 | 2.06 | 0.00 | 344,000 | 34,461 | 6.83 |
| 20. | Bardejov | 25.60 | 0.00 | 0.62 | 0.00 | 2,090,000 | 33,060 | 6.56 |

4. Results and discussion

4.1. Calculation of total online reputation

The first step of the analysis was to identify entities. Based on the most recent data from the Slovak Statistical Office [Statistical Office of Slovak Republic, *Počet obyvateľov SR k 31. 12. 2014 - Population of SR up to 31st December 2014*, http://www7.statistics.sk/wps/wcm/connect/5e23ea37-8b0a-457d-b91d-28bba69bbda4/Obce_2014.pdf?MOD=AJPERES] we identified twenty largest Slovak towns/cities which were then sorted by size starting with the largest of them (see Table 2). Next we started with the basic research regarding online identities of these entities through the Google search engine. To ensure the objectivity of the results and to avoid personalized search results, we have taken measures to ensure the greatest possible relevance of the findings.

The survey features only organic results. The overall assessment of online reputation of twenty largest Slovak cities is presented in Table 2.

The first groups of measurements under the advanced sentiment analysis (ASA) takes into account the first 10 search results. As a keyword we used the well-known and well established name of the town/city, regardless of the home website. The final score for each of the entities has been thoroughly recorded. Based on the analysis we found that in terms of the online identity of the research subjects – the first places in the search results are dominated by websites owned or managed by towns/cities. The dominant sentiment group consisted of search results with neutral sentiment. Only three entities had a positive sentiment (Bratislava, Trnava and Žilina). Second measurement under the advanced sentiment analysis took place under slightly adjusted methodology, since it was directed at towns/ cities and because previous measurements showed the predominantly neutral character of the results, we refrained from adding another keyword to the search engine. Instead we repeated the measurement with one parameter, this time in the Google tab ‘News’. Given the greatest possible relevance of the results we did not take into account sentiments regarding sports news. Sports news was given indiscriminately neutral sentiment. It should be pointed out that in terms of the dynamics of published reports this was the least stable parameter. We found that analysed subjects, apart from two cases (predominantly Martin city due to the receivership), showed moderate to high positive publicity in terms of online editions of the major Slovak dailies. The sub-scores of the first and second measurements were summed up and unified into percentages. They can be found in Table 2 in the column ASA score.

In the second step of the analysis we identified dominant reputation determinants based on the reference research. Reputators include the social networking site Facebook, Twitter and an online database of videos YouTube. Given the absence of ranking evaluations on these social networks we had to calculate the competitive score (CS) of individual reputation determinants. In the first step we identified the official profiles directly set up or run by a particular town/ city and also the number of fans of those profiles on Facebook (FCS), Twitter followers (TCS) and even subscribers of YouTube channel (YCS). The calculated score of the competitive advantage of individual reputation determinants for each of the entities was subsequently recorded in the columns TCS, FCS, and YCS. The analysis revealed that each of the selected towns/cities has its official Facebook profile through which the town/city communicates with its residents. With regard to the number of fans the highest number scored Trnava with more than 13,000 fans with a fairly large margin over the second Bratislava. When it comes to Twitter, most towns/cities in the top 20 have gradually started to use this communication channel popular mainly among young people. In terms of followers Bratislava dominates with more than 70% share, which in absolute terms represents 4.530 followers. When it comes to YouTube, towns/ cities in the top 20 use this channel very rarely. In terms of subscribers Martin is in the leading position with 128 subscribers of its YouTube

channel. When compared with other towns/cities, its share is slightly more than 35%. In the third step we calculated the total advantage of the entity's online reputation with regard to its pre-defined competitors. With regard to the overall strength of Slovak towns/ cities online reputation, Bratislava is a clear winner, especially given the complexity with which the city approaches modern marketing communication tools. An interesting but far from surprising finding is Martin's position, mainly because of its momentary negative reputation resulting from the sentiment analysis. The current failure of one of the pillars of its online reputation is replaced by a relatively high score when using YouTube. We can see that any efforts made pays off, given the relative passivity of the 'competition', especially when using YouTube, which is, inter alia, a great means of crisis communication.

5. Conclusions

Cities in the leading positions have a distinctive advantage in terms of their online reputation among Internet users. In case the user seeking information about a particular town/city does not encounter positive reputation indicators, this can ultimately affect his/her overall perception of the town/city. This is especially true if we are speaking about tourists who have not personally visited the town/city yet and they make their opinions solely on the basis of information present in the online environment. Towns/cities should attempt to curb negative publicity, and vice versa, to enhance and work on the positive publicity. This can be achieved particularly through the active online communication policy like dissemination of positive information through renowned major online newspapers or social networks. The best way to remove negative or neutral publicity in the first ten search results is a literal displacement of negative publicity by a thoughtful marketing communication policy conducted in the online environment. In general, it would seem that the most effective model of the comprehensive online reputational management is to focus on dominant reputation determinants, namely Google search results and active management of the profile on one of the social networks. Doing so may have positive effect only in the short term, users will demand content from platforms unused by the town/city (Twitter and YouTube, as resulting from the analysis), regardless of who is the content manager of the profile on these platforms. In this way, commercial entities presenting themselves as official profiles can attract a large number of customer base. By building a community and cultivating the habits of favouring third-party content over the content published by the town/city, they may lose a large portion of potential Internet users. Given the fact that users who demand more content are the most active in the online environment, it would be a hard blow to lose such an audience in today's over-competitive times. As one of the authors says [<https://www.podnikajte.sk/manazment-marketing/c/1392/category/marketing/article/online-reputacny-manazment.xhtml>], active instruments of the online reputational management can greatly facilitate active communication with

public, help in acquiring and evaluating feedback or speed up implementation of measures related to a crisis marketing communication. Without a strong base of users none of this is possible, not with a significant result.

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