

Mining web and social networks for consumer attitudes towards government-owned Croatian national airline

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Abstract—The paper gives a critical insight into process of evaluation in public relations and also points out similarities and differences among contemporary PR and marketing. The aim was to examine the applicability of sentiment analysis to image measurement in a case of Croatian national airline Croatia Airlines (CA) and evaluate company's public relations efforts. The authors observed Croatia Airlines during the reconstruction phase, after several years which company marked with strikes and financial problems. The analysis showed that company has mostly positive image among customers and in new media. Company's Facebook page was analyzed with a goal to determine PR efforts. Thus, results indicated that the page is mainly used for one-way communication. This showed how efficient public relations were and where the company has place for improvement. The customer opinions and attitudes were revealed as very valuable information for company's strategic approach in building its image.

Keywords—Facebook analysis, marketing, public relations, sentiment analysis

I. INTRODUCTION

WITH the growing conscience about the importance of public relations (PR) for organizations, the profession of public relations entered the stage of redefining. The value of PR and methods of its measurement became a glowing issue for the further development and credibility of the profession.

In PR, a measurement called Return on Investment (ROI) is defined as “a ratio of how much profit or cost saving is realized from an activity against its total cost, which is often expressed as a percentage. In reality, few PR programs can be measured in such a way, because of the problems involved in putting a realistic and credible financial value to the results achieved [1]. In regard to that, term ROI is very differently interpreted in public relations.

Although effects of PR are evaluated in various ways, there is still lack of applicable evaluation models such as Jim Macnamara's [2] Pyramid Model. This model consists of several stages of research and ends with measuring outcomes, as well as attitudinal and behavioural changes.

In this cumulating evaluating process, the first stage called

inputs is provided for measurement of the selected medium, content and format.

The second stage called *outputs* is aimed for program evaluation, and finally *evaluation* presents the measurement of communication effects.

There is also a fourth stage proposed, called *out-takes*, which is used for measuring parts of messages that audiences take over.

For this model Macnamara [2] suggests low cost methods such as secondary data, advisory or consultative groups, unstructured and semi-structured interviews, but also using online space in terms of “chat rooms”.

The awakening about the importance of online techniques in PR also emerged from the 2nd European Summit on Measurement in 2010 that was held in Barcelona and where evaluation standards were the key topic of the discussion.

The standards were adopted and presented in the document called Barcelona Declaration of Measurement Principles [3].

Along with the Declaration, seven principles for measurement in public relations were presented:

1. Importance of Goal Setting and Measurement
2. Measuring the Effect on Outcomes is Preferred to Measuring Outputs
3. The Effect on Business Results Can and Should Be Measured Where Possible
4. Media Measurement Requires Quantity and Quality
5. AVEs are not the Value of Public Relations
6. Social Media Can and Should be Measured
7. Transparency and Replicability are Paramount to Sound Measurement

The sixth principle clearly states and emphasizes that online evaluation is possible and necessary in public relations.

Compared to the online evaluation, the traditional evaluation is expensive and long lasting. Besides funds needed to conduct research, obstacles for PR practitioners are insufficient knowledge and time.

On the other hand, new ways of communication through information and communication technology (ICT) opened numerous opportunities to evaluate PR efforts in short time and with simple tools.

As soon as the Web became a place for conversation, information and knowledge exchange PR profession started looking to a new horizon.

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II. PR CONNECTION WITH MARKETING

Public relations intertwines with other disciplines which together lead to the achievement of organization's goals. First of all public relations is very closely connected to marketing. These two professions are very often in a position to support each other.

S. M. Cutlip, A. H. Center and G. M. Broom [4] deem forms of public relations assistance to the marketing function:

- publicising news and events related to the launching of new or improved products or services
- promoting established products or services, to the extent that they are newsworthy
- creating a favourable image of 'the company behind the product'
- arranging for public appearances of marketing spokespersons
- probing public opinion in market areas
- focusing news media attention on sales conferences and other marketing events, and
- assisting in programmes concerning consumerism.

This close connection between two professions is the reason why PR is sometimes understood as a part of marketing. Integrated marketing communications (IMC) is one of the terms that is coined nowadays and explains how marketing and public relations can cooperate.

If it seemed hard to differentiate tasks of two professions before the development of ICT, now it looks even harder. For David Meerman Scott [5] old rules of marketing and public relations aren't enough for online practice.

Online tools and techniques provide ways for direct communication with markets. PR and marketing experts are using them to get in touch with consumers, shareholders and employees.

Communication with the public was before intermediated by traditional media such as radio, television and press.

In practice, the evaluation was based on press clipping which can be described as a method based on counting and collecting press materials about represented organization or campaign.

The message placed in media could be an indicator of certain influence on audiences but it isn't enough for bringing a conclusion on effectiveness of PR campaign. It misses the measurement of a final step in Macnamara's [2] Pyramid Model, the outcome or changes in target audiences attitudes and behavior.

The biggest advantage of online space is that it is possible to get an insight on individual attitudes and opinions. Comments, consumers reviews on social networks are mostly publicly open for different sort of market analysis. For that reason boundaries between public relations and marketing are fading on Web.

The user generated content (UGC) provides data on different issues and now is available more than ever. Today the new opinion makers are bloggers. The efforts for PR and

marketing are placed on developing close relationships with individuals, or micro markets, which very easily can spread their contentment about a product or organization with the others.

One-way communication through advertisement isn't efficient enough.

Rob Brown points out: "The future of marketing communications rests with the art of conversation. Engaging in conversations is what public relations people have always done." [6].

Reaching PR or marketing goals means nearly the same. Meerman Scott [5] deems that online content in all of its forms is causing a convergence of marketing and PR that does not really exist offline.

The converged PR and marketing made possible to conduct campaigns that are on lower cost because they are working together.

"With tight budgets in a slow economy, especially, we find that professionals are taking advantage of PR and marketing promotion together to maximize campaign efforts." [7]. Cooperation between PR and marketing should be based on equality and not in terms of subordinate and manager.

As the same how "PR is moving into the inner sanctum of Web marketing and must now partner with it to measure, learn, and evolve" [8], marketing depends on knowledge and skills from profession of public relations.

III. SENTIMENT ANALYSIS

New ideas in a new time led us to the concept of PR 2.0 which is characterized by the use of different methods than those that were used before.

"PR 2.0 favors engagement more than hits, referrals more than eyeballs, activity more than ad value, sales more than mentions, and market and behavioral influences more than the weight and girth of clip books." [8]

Today, a great number of analytical tools that are available for measurement can be downloaded from the Web for free.

Such tools can give various information on how many visitors have visited a certain page, how much time they have spent there, what were they looking for, as well as demographic data about online users.

In this vast area of information it is very important to know what information is relevant for the evaluation in public relations..

For Kunczik [9], the key problem of online interaction is identification of online publics.

It is harder to confirm someone's identity due to the physical distance between users.

The evaluation can be properly conducted using new approaches.

For example, as Phillips and Young [10] point out: "Valuing of a blogging campaign might include the value of visitors, the secondary value of comments, and the tertiary value of mentions in other social media (the more valuable ones are those that point back to the organization's blog or website)."

Jim Sterne [11] emphasizes some business outcomes that are measurable and important for PR:

- awareness - how many people know about your company or offering
- survey completions - how many were willing to answer your questions
- subscriptions – how many signed up for your newsletter, blog, or tweets
- registrations - how many wanted to be a member of your club
- blog comments - how many were engaged in conversation
- blog posts - how many mentioned you to others
- leads - how many are potential customers
- purchases - how many actually bought something from you.

Focusing on keywords in comments can be an effective way to find out what are the dominant attitudes and opinions on a certain issue. It can be useful for measuring perception.

Solis and Breakenridge [8] recommend the use of a “suckometer” or “DIEometer” when running a search on a Web browser.

They propose a query consisting of words such as “yourcompany+sucks” and “DIE+yourcompany” [8]. In order to use it properly, it is important to think of the words that consumers would use with the organization's name.

In the past few years, the term sentiment analysis or opinion mining marks the use of natural language processing applications to get an insight on users' attitudes and opinions.

Pang and Lee [12] define sentiment analysis as a method that seeks to identify the viewpoint(s) underlying a text span.

Other authors see it through the polarity of individual perspectives. “Sentiment analysis is the task of identifying positive and negative opinions, emotions, and evaluations.” [13]

Although the importance of the sentiment analysis has been recognized quite early in the scientific literature [14], a widespread research interest in opinion mining developed only at the beginning of the current century [15, 16, 18-27].

Despite its popularity, many researchers still emphasize [17]: “Some of the most effective machine learning algorithms, e.g., support vector machines and conditional random fields, produce no human understandable results such that although they may achieve improved accuracy, we know little about how and why apart from some superficial knowledge gained in the manual feature engineering process.”

The sentiment analysis of any text written in a natural language employs various statistical and linguistic approaches.

In a statistical approach, machine learning algorithms analyse whether keywords in text have a positive or negative sentiment based on the binary analysis, focusing either on the frequency of words or relevance of co-occurring words.

Also, classifiers at the document level [28] are used for sentiment classification (decision trees, Naive Bayesian classifiers, quadratic classifiers, neural networks, k-nearest

neighbor classifiers, Bayesian networks, Support Vector Machines, hidden Markov models, etc).

Linguistic approaches use sentiment libraries [29] containing thousands of words that represent attitudes, qualifiers, or preferences that indicate an opinion about a certain topic.

Sentiment analysis is very useful for planning and evaluation in public relations.

An important piece of information during the decision-making process is what other people think.

There are many sentiment analysis tools which can be used for online evaluation in public relations.

But, many of them are dealing with the same problems, since “metaphors afford interpretations that clash with the literal and so words must be taken literally lest they lose their meanings.” [30]

Computers still aren't completely precise in sentiment analysis of content, since for humans even the simplest words have a variety of meanings, which are a complex combination of human emotions, experience and knowledge.

IV. SENTIMENT ANALYSES OF CROATIA AIRLINES

Croatia Airlines (CA) is a Croatian national airline company which is confronted with financial problems that began in 2008, after two years of successful and positive financial annual reports.

Nowadays CA is trying to obtain the high level of quality of their services despite the negative financial results that track this company from 2008.

Croatia Airlines reports that the reasons for poor financial results can be found amongst all in global economic crisis and high prices of fuel¹.



Fig. 1 logo of Croatia Airlines

The situation even got worse in July 2010 when syndicate of Croatia Airlines cabin personnel started a strike with a demand for respecting their work rights.

Years which were concluded with poor financial results affected the situation in CA. The company had huge problems with the strike of their employees in May 2013.

Dissatisfied employees protested because of new collective contract which implies that they will have to accept lower wages.

The loss in millions of euros over the years brought this

¹ <http://www.croatiaairlines.com/hr/O-nama/Mediji/press/2009/258/Zbog-visokih-cijena-goriva-Croatia-Airlines-u-2008-godini-ostvario-gubitak>, retrieved 20.06.2013

company to the point where it can only choose between selling the company or starting a new partnership.

Although before it was only speculated that CA will enter the process of privatization, according to many recent media reports it became an inevitable fact.

The aim of this research is to evaluate the recent rating of Croatia Airlines, under the consideration that negative financial results over the years and two strikes of CA employees could have influenced the company's image and rating.

Our research question tries to examine whether effects of negative financial situation influenced the image and the rating of Croatia Airlines.

The hypothesis was set that Croatia Airlines still has rather positive image among passengers and in public, despite the negative financial situation in the past few years.

A. SentiStrenght analysis of passenger reviews

The research was conducted with sentiment analysis tool SentiStrenght (.<http://sentistrength.wlv.ac.uk/>)

Since serious financial problems for CA started in a year 2008, we assumed that the negative financial situation could appear and influence company's functioning approximately a year after problems emerged.



SentiStrenght estimates the *strength* of positive and negative sentiment in *short texts*, even for informal language. It has [human-level accuracy](#) for short social web texts in English, except political texts. SentiStrenght reports *two* sentiment strengths:

-1 (not negative) to -5 (extremely negative)

1 (not positive) to 5 (extremely positive)

It can also report binary (positive/negative), trinary (positive/negative/neutral) and single scale (-4 to +4) results. SentiStrenght was originally developed for English and optimised for general short social web texts but can be configured for other languages and contexts by changing its input files - some variants are demonstrated below.

Quick Tests (English version):

Enter text:

Output: Dual, binary, trinary, scale

Fig. 2 SentiStrenght interface

For that reason, the analysis with SentiStrenght covered a period of four years (from July 1st 2009 till June 30th 2013).

SentiStrenght is a sentiment analysis tool used previously in several research papers [31, 32] where it proved its relevance.

It is an open source application which allows the quick analysis of the input text.

The evaluation of the text is represented on the positive scale from 1 to 5 as well as the negative scale from -1 to -5.

The ratings 1 and -1 represent neutral and weak negative sentiment, while 5 or -5 represent strong sentiment (extremely positive or extremely negative).

The application can even be used for the analysis of the informal language.

SentiStrenght can be adjusted for the analysis of languages other than English, but it is necessary to translate the term list. In this research, the application was used for the analysis of

passenger reviews on websites which collect the travel ratings and reviews.

The research included analysis of the following websites:

- Skytrax (<http://www.airlinequality.com/>)
- Routehappy (<https://www.routehappy.com/>)
- Airlikes.com (<http://www.airlikes.com/>) and
- Review Centre (<http://www.reviewcentre.com/>).

The analysed sample consisted of 44 passenger reviews from selected websites.

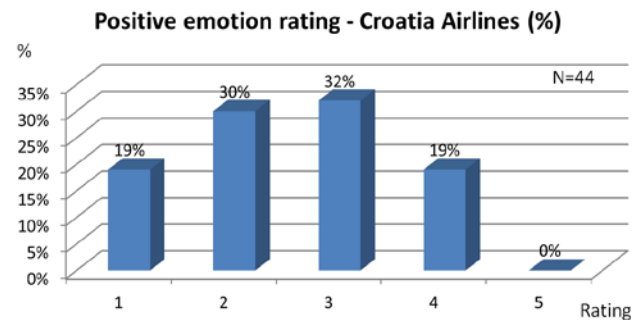


Fig. 3 positive sentiment rating of Croatia Airlines in passengers' reviews

The result of the analysis presented in Fig. 3 shows that positive sentiment associated with Croatia Airlines mostly obtained level 3 rating (32 %) on the scale from 1 to 5 (1 - neutral; 5 - extremely positive).

The following most frequent rating was level 2 (30 %).

Overall, passengers' opinions and attitudes towards CA can be described as moderate positive sentiment on the positive sentimentscale.

The frequency of the rating level 4 is lower, only 19 %. The rating level 1, which implies neutral sentiment, revealed that 19 % of passenger reviews were neutral.

On the other hand, the rating level 5 revealed that none of the passengers expressed an extremely positive sentiment in the review.

Some of the positive feedbacks towards Croatia Airlines were:

- "nothing very fancy but a pleasant way to travel"
- "very clean aircraft in very good condition, friendly personnel, smooth flight"
- "generally, good service for 1.5 hour flight"
- "I think it is very good value"
- "good airline, offering good product"
- "very impressed with their service"
- "we really enjoyed both flights"
- "one of the best flights I've had with this airline over the years".

The word frequency method showed that words "good" (24 occurrences), "like" (13 occurrences), "nice" (9 occurrences), "pleasant" (5 occurrences) and "excellent" (5 occurrences) often occurred in positive sentimentratings.

The specific booster word "very" (42 occurrences) was

often used for strengthening the positive or negative sentiment (the examples of two positive phrases are “very good” or very nice”).

On the other hand, results of negative sentiment ratings (Fig. 4) indicate that Croatia Airlines is by majority of passengers not perceived very negatively.

It obtained the rating level -2 in 44 % of reviews on the scale from -1 to -5 (-1 – neutral; -5 – extremely negative).

The next most frequent rating was the rating level -3 in 28 % of the reviews.

The neutral sentiment was present in 23 % of the reviews, while the rating level 4 was found in only 5 % of the reviews.

The extremely negative sentiment towards this company (the rating level -5) was not found in any of the passengers’ reviews.

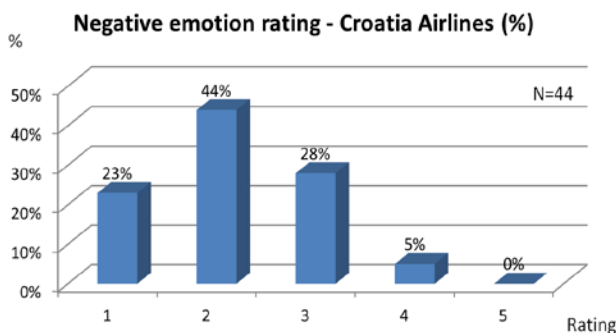


Fig. 4 negative sentiment rating of Croatia Airlines in passengers’ reviews

Several negative comments were:

- “the food, for business class, was more than disappointing even at that early hour”
- “all together, a very bad experience for a lot of money”
- “both flights seemed to be disinterested in servicing customers”
- “the worst company ever to fly with”, “grumpy unfriendly crew, food inedible”.

The most frequently used negative words were:

- “bad” (4 occurrences)
- “badly” (2 occurrences)
- “problem” (4 occurrences)
- “problems” (3 occurrences)
- “worn” (4 occurrences) in noun phrase “worn out seats”
- “worse” (3 occurrences)

The booster word “very” increased the strength of negative phrases in “very negative” and “very bad”.

The overall ratio of the positive and negative sentiment (Fig. 5) indicates that airline company Croatia Airlines succeeded to maintain rather positive than negative image among passengers in the past few years.

Ratio of positive and negative sentiment - passenger reviews on Croatia Airlines (%)

N=44

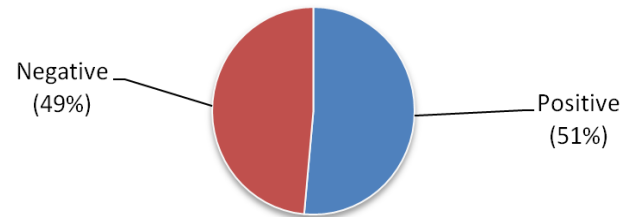


Fig. 5 overall ratio of the positive and negative sentiment

The recent study of Mohamed M. Mostafa [33], which included sentiment analysis of tweets for several airline companies in 2013, showed that Egypt Air had mostly negative sentiment score (70 %), as well as Kuwait Airways (71 % negative).

On the other hand, Fly Dubai had more positive (60 %) than negative (40%) overall sentiment score.

The comparison of these results with the overall sentiment score for Croatia Airlines indicates that Croatian national airline company still has potential to be on track for success.

B. Social Mention analysis of Croatia Airlines

Social Mention (<http://socialmention.com/>) application is used for searching and analyzing information in new media.

It includes monitoring of more than a hundred of different sources such as Twitter, Facebook, FriendFeed, YouTube, Digg, Google, Flickr, Delicious, Photobucket, Yahoo News and other.

Social Mention provides a real-time analysis and is helpful for tracking and measuring online user generated content on the different topics (companies, people, products).

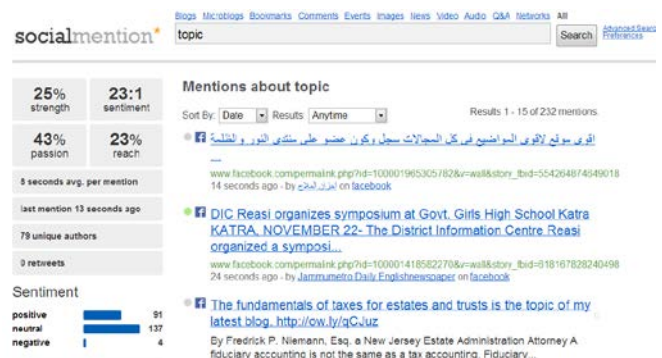


Fig. 6 Social Mention interface

As part of our research, we examined the overall sentiment towards Croatia Airlines, analysing every mention of CA in a one month period (from August 13th 2013 to September 12th 2013).

The results in Fig. 7 revealed that mentions of CA are

mostly neutral (89 %), followed by positive mentions (11 %). In our experiment, we did not find even one negative mention of this company.

Overall, Croatia Airlines company is most frequently mentioned on:

- Twitter (32 occurrences)
- Flickr (17 occurrences)
- Ask (7 occurrences) and, finally
- Youtube (6 occurrences).

It is not unusual that the largest number of mentions was found on Twitter, since Twitter is mostly used for the fast and dynamic information exchange.

Social Mention Analysis - Croatia Airlines (%)

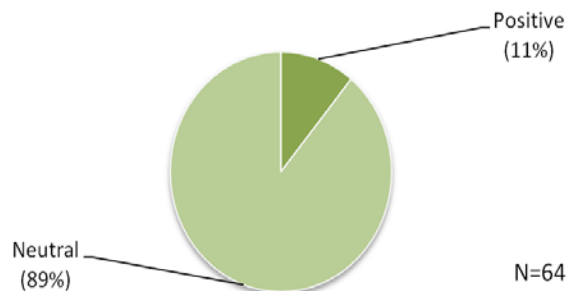


Fig. 7 mentions of Croatia Airlines on Twitter, Flickr, Ask and Youtube

When it comes to positive mentions, we found 4 positive sentiments on Twitter, dealing with the financial situation and the possible takeover of CA.

Furthermore, two positive videos were placed on Youtube: one video titled „Croatia Airlines - Epic 15 Minute Full HD Tribute”, dedicated to crews and workers of Croatia Airlines and the other titled “Croatia Airlines A319-112 [9A-CTL] Landing @ Berlin-Tegel 06.07.2013 (HD)”, showing the landing of an aircraft.

Finally, one positive mention on Facebook dealt with the need for the direct flight from Dublin to Zagreb.

The results indicate that Croatia Airlines is perceived more positively than negatively in various new media and that it makes a desirable partner in the market.

V. CROATIA AIRLINES FACEBOOK PAGE

Facebook is the most popular social networking website which counted over 1 billion users in 2013.

These users who dislike the notion of traditional media filtering the news for them, today have a chance to decide on their own about the relevance of an event [34].

Companies all around the world use Facebook for promotion of their services, products and corporate identity. Industries also use Facebook monitoring and analysis to track opinions about products and brands [35].

As all social networking sites, it is intended for establishing two-way communication.

The study² conducted by Socialbakers in 2012 shows that companies mostly ignore questions posted by their Facebook fans and even close their walls on Facebook (25%) to block fans' questions.

Nevertheless, the research³ on the most socially devoted industries and brands (Socialbakers, 2012) indicated that following industries achieved the best Response Rate on Facebook:

- Telecom (60,4 %)
- Airlines (55,0 %)
- Finance (46,4 %)
- Retail (43,6 %) and
- Fashion (41,5 %).

In November 2013, Croatia Airlines Facebook page reached a number of 70 000 fans (followers) with a trend of growth. Considering results that show a high percentage of social engagement in the airline sector, the analysis of Croatia Airlines Facebook page was conducted with the aim to measure company's efforts in obtaining good relationships with their publics.



Fig. 8 Croatia Airlines Facebook page

The analyzed period of CA Facebook page dates from June 1st to July 31st 2013.

In this analysis we measured public relations activities on Facebook page of CA after the big strike of Croatia Airlines employees that happened in May 2013.

CA efforts after the big strikes and bad financial results over the years revealed what happens to online PR activities in times when company faces a process of privatization.

Public relations should also have considerable role in the process of privatization, especially if it comes to partnership between, as Toni Muzi Falconi [36] states, highly diverse organizational cultures.

² 70% of Fans Are Being Ignored By Companies – Now what?, 70% of Fans Are Being Ignored By Companies – Now what?, <http://www.socialbakers.com/blog/655-70-of-fans-are-being-ignored-by-companies-now-what>, retrieved 18.06.2013

That includes efforts to build relationships with new publics.

Response Rate (RR) is used to measure the number of fans' posts in relation to a number of replies by the Facebook page administrator.

The use of this metric in the case of Croatia Airlines Facebook page showed that in the two month period administrators replied to 20 out of 143 comments of the fans. Response Rate of 14% for CA Facebook page still varies by month, sine Response Rate in June was 16 %, while in July it was 12 %.

The page administrators actively responded to fans questions regarding flights information and prices of airline tickets, but they were not engaging in critical discussions about Croatia Airlines.

As for comparison, the research⁴ provided by Peter Claridge in 2012 indicated that American Airlines responds to 42 % of fan posts, which is perceived as an exceptional effort.

On the other hand, the results revealed that US Airways did not engage in replying to fans comments on Facebook at all.

Average Response Time (ART) shows how quickly administrators of the Facebook page respond to fans posts. The analysis of Croatia Airlines Facebook page revealed that the ART for CA was 4 hours and 55 minutes: ART for CA in June was 55 minutes, while in July it was 10 hours and 54 minutes.

These results show large oscillations in a two month period and company's inconsistency in PR activities.

For the sake of comparison, the analysis of Facebook use by airlines in United States in 2012 (performed by Peter Claridge) indicated that JetBlue Airways had the best ART of 1 hour and 12 minutes among seven companies.

The worst result had airline company Delta with the Average Response Time of 7 hours and 41 minutes. Croatia Airlines has proven that it is possible to obtain the ART of below 1 hour time.

Still, the Average Response Time of 4 hours and 55 minutes for CA can be perceived as an average effort to respond in time in a comparison to the US airline companies, among which United had approximately the same ART of 4 hours and 49 minutes.

Companies should have in mind that promptness and quickness in response make an important part of social networking.

The analysis of Croatia Airlines Facebook page indicated that company is using the most popular social networking site mainly for one-way communication to provide information about their flights, game shows and prices of airline tickets.

VI. CONCLUSION

The profession of public relations, same as marketing, is

part of the information age.

In a contemporary world it seems much easier to gather information, but much harder to decide which information has value.

That is why evaluation in PR has been a key issue for years and providing the right answer to what the value of public relations is will lead the profession into the future.

In order to achieve that it is necessary to implement evaluation models in practice.

PR and marketing are now cooperating more than ever and are using the same approach to achieve goals.

Online tools for evaluation are very effective because they are low cost, can be used for analysis in a short time, and are directly used for the measurement of online user comments (attitudes and opinions).

The value of sentiment analysis tools SentiStrenght and Social Mention was proved through analysis of the Croatia Airlines image.

The Croatian national airline company CA is at the turning point. Poor financial results over the years brought CA to the list of possible privatization candidates. The evaluation of passengers' reviews showed that company still has the slightly positive image.

Mentions in social web also revealed that the image of CA in public is more positive than negative.

Regardless the financial problems that CA faced, it seems that they did not influence much the quality of their services.

The Facebook analysis showed that administrators of CA Facebook page are not using the potential of social media.

The Response Rate and Average Response Time indicate that one-way communication is more of a rule than an exception.

Administrators do not interact with online users when it comes to criticism towards Croatia Airlines.

Nevertheless, the company's current image makes CA a desirable partner and indicates that it could have bright future under new conditions.

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