Strategic Competition of Internet Interfaces for XU30 Quoted Companies

Sadi Evren Seker, Bilal Cankir, and Mehmet Emin Okur

Abstract—Internet is causing paradigm shifts on almost every aspects of the life. One major paradigm shift also occurs on the strategic competition field. The new strategic competition is studied based on Porter's value chain analysis and Internet can be considered as a technological improvement on the information and communication technology, which can also be considered as an interface between companies and the environment. The company/environment interface is directly related to the strategic competition and Porter's five forces. By the new paradigm of information and communication, companies should pay a great attention on their Internet based reputation built on the Internet based interfaces. For example, a company with millions of shares on the social media has an obvious advantage over a company on the same sector without any web page. In this study, the companies are criticized by their Internet interfaces, which are social media interfaces such as Facebook or Twitter and company web pages and blogs measuring hate-marks and love-marks of the companies and Web 2.0 sources such as wikis. After collecting statistical information about these Internet interfaces of each company on Internet interfaces, the companies are indexed based on their Internet interface utilization. Furthermore a new model of competition based on Porter's value chain analysis is built and applied for the Internet interfaces.

Index Terms—Strategic competition, stock market analysis, business intelligence, ICT, data mining, reputation management, web-o-metric.

I. INTRODUCTION

By the increasing spread of Internet, every concept is reforming and shifting to the electronic medium. One major paradigm shift is the information and communication technologies. For example, new media concept brings out to the companies a completely new ways of communication.

The paradigm shift on these concepts brings out an electronic transformation on the classical approaches like competition and reputation.

The companies, which are not isolated from the environmental revolution of electronic transformation, have interfaces of web pages and social media in order to communicate with social stakeholders. Porter also defines this environmental relation with micro and macro environment terms. The relation between companies and the customers

Bilal Cankir is with the Department of Business, Kirklareli University, Kirklareli, Turkey (tel: 0090-05322343709; e-mail: bilalcankir@klu.edu.tr).

Mehmet Emin Okur is with the Department of Business, Marmara University, Istanbul, Turkey (tel.: 0090-05327936060; e-mail: mokur@marmara.edu.tr).

through social media or Internet web pages can easily be considered as a microenvironment relation of the company. By the definition, the environment of companies is reshaped with the impact of Internet.

In this study, the affect of Internet on reshaping a new paradigm for the companies is research by the statistical methods (Fig. 1).



Fig. 1. Data flow diagram of the study.

The management capabilities of companies are collected through the Internet based statistics, which are built on four major groups. Those groups are listed as below:

- Company Web Pages
- Social Media statistics of companies
- Hate-marks and Love-marks of companies
- Web 2.0, wiki

After collecting the statistical values, each parameter is indexed within its group. For example, the number of backlinks to a company web page, or the number of visitors, or the ranking of the web page are all considered in the company web page category. On the other hand, the statistics related to Facebook, linked-in or Twitter are all considered in the group of social media. Each parameter is statistically indexed within its group and after this indexing phase, four major indexes are built.

Manuscript received March 10, 2014; revised June 30, 2014.

Sadi Evren Seker is with the Department of Business, Istanbul Medeniyet University, Istanbul, Turkey (tel.: 0090-5324467882; e-mail: academic@sadievrenseker.com).

Finally, these four major indexes are also correlated in order to end up with a single index of Internet interface impact for the companies.

Besides the statistical and technology metric studies above, the approach of Porter and his value chain analysis is also studied. By the reshaping effect of Internet over the competition between companies, the new paradigm should be well explained from the viewpoint of business and management.

II. BACKGROUND

Strategic competition concept is one of the major subjects in management, which is well studied by many scholars. In this paper, the new paradigm of social media is related with the strategic competition approach of management studies. The relation of Internet or social media and strategic competition concepts can be built on the following ideas below. Each of the hypotheses below will be explained in details.

- 1) Social media creates a community of people with similar views, needs, feelings, demands or perceptions.
- 2) Internet makes the communication faster and both customer bargain and supplier bargain power can be considered as increased. This idea is related with the two of five forces of Porter.
- 3) By the Internet technologies, there is no more time constraints to access the services or products.
- 4) By the paradigm shift, based on the Internet technologies, the perception of service and products are also transformed.
- 5) Social media, brings out the powerful customer voice.
- 6) More powerful customer-to-customer (C2C) communication is possible by the new media.
- 7) Paradigm shift of Internet technologies brings out the non-geographical boundaries for the products and services.

The idea of communities created by the social media impact can also be viewed as a redefinition of society. Techno culture or e-society concepts are widely spreading and create groups of people with the same life styles and standards. The idea of transformation of products and services is also well studied on several publications of Porter [1], [2]. The same idea is also supported by several other scholars [3]-[5].

Also, Porter underlines the the idea of faster communication and impacts of communication power on the competition in his studies [1].

Internet creates new concepts like online shopping or e-business on both the products and services. The availability of 24/7 access, demolishes the time constraints on the business models [6].

Another important concept is the transformed product and service concepts by the Internet impact. For example customers can purchase an airline ticket online at any time or can do most of the banking operations through the web pages [7].

Our fifth hypothesis indicates the powerful voice of customers by using the Internet media. For example, users can write into blogs or web sites to indicate their complains immediately. Also most of the e-trading web sites, gives users a feedback form in order to collect their opinions and increase the customer satisfaction [8].

The sixth hypothesis we claim is the increasing impact of C2C business availability on the Internet. Thereby, to uphold a brand community one should "weave through the fabric of community" and not only recognize the consumer-consumer relationships but also delve into consumer relationships with the brand, the product, and marketers to provide a more complete picture of dynamic brand community relationships [9].

Despite the fact that the concepts of consumption community and brand community were established long ago, only recently has the concept of brand community become important in the marketing field [10] and it is defined as a "specialized, non-geographically bound community, based on a structured set of social relations among admirers of a brand" [9].

Despite the increasing capabilities correlated with the Internet and social media diffusion, scholars are still trying to model the linkage between technology investments and financial performance of the firms [11]. Some researches in the MIS area are trying to correlate the statistical ICT data and the performance of the company [12].

As the aim of our paper, we use tools of web-o-metric research like Google page rank, number of visitors, number of pages linking back to the web page or the number of likes on Facebook, in order to create a reputation index [13]. Our intention is to be as simple and usable as possible.

Furthermore we conduct the web-o-metric with other ICT environments, which can affect the reputation of the company, such as social media [13], weblogs [14], blogs [15] and wikis [16]. Also some studies are ongoing about the correlation between newspaper news and the financial status or the reputation of the company [17]. It is an open field of research to successfully crawl over the web and mine the valuable information successfully [18].

III. COMPETITION EXTRACTION

In this study, the competition is based on the Internet based interface capabilities as it is already discussed in the background section of this paper. In this section, all the parameters will be explained in detail and the relation between the parameter and the competition will be discussed.

A. Web Page Statistics

Web page statistics are built on several parameters like the backlink count, page ranking or the number of visitors to the web page. Each of these parameters is collected from different data sources.

Value of the Site. Some of the independent organizations offers a free agent to calculate the expected value of the web site via the web indicators like Alexa ranking or Google page rank. Most of them are built on the number of visitors and expected click from the visitors to make a valuing. The maximum expected value of a company web page is 621.305 and average value of the company sites in Turkey is 105.724 USD.

BING Backlinks. The BING back links are collected from the search engine of Microsoft, Bing. The maximum number of Bing backlinks is 3540 for Akbank and the average number of back links is 137.

Google Backlinks. Google backlink count is the number of page sites indexed by the Google crawler. This number is under the effect of two facts. First, the number of pages held on the web site is limited. For example if a web site has only 1 page, the maximum possibility for the Google backlinks is 1. Second, even the web page can hold multiple pages, Google can crawl only a part of the web pages. The maximum number of back links is 3.313.000 for TurkTelekom, while the average is 307.817 for all 30 companies.

Google Trend is the publicly available trend calculator built on the Google search data. Trends values can be both queried as a time series or as the latest value of the trend. We have also added the Google trends values for each of the companies in BIST30 as their brand values. The trend values of the brands vary from 19 to 100 where the 100 is the maximum available and 0 is the minimum possibility of the Google trends.

Daily Unique Visitors parameter is the average number of visitors per day. The daily visitor number can vary from date to date and we have collected the up to date values during the research time. The maximum visitor is 637.285 for Garanti Bank and the average for 30 companies is 62.656.

Alexa Ranking parameter is another indicator published by an Amazon owned web site alexa.com. The lesser number means the web page has a higher ranking and the minimum ranking for the web site is 24 in Turkey and highest ranking is 65.836 among the whole Turkish web sites on the Internet. Another parameter is the Alexa global ranking, similar to the Turkish ranking. The lowest global ranking is 1.442 and the average is 570.013 among all the web sites on the Internet.

Time on Site is a web indicator to measure the time spending of the users with a time interval of their entrance and exit. The higher time means a higher reputation for the web site and the maximum value of time spent on the web page is about 8 minutes and average is about 4 minutes. These time intervals are also daily, which means the time on site indicator is an average day based time spending on web page for each of the user.

B. Social Media

The social media statistics are collected from three different social networks, which are linked-in, Facebook and Twitter. Each social network has different characteristics. For example Facebook pages have the number of followers or shares or Linked-in has special company sites and number of peoples joined to these groups. Each parameter is explained in detail and the relation between social media parameters and the competition will be explained.

Has a Facebook Page? We have checked whether the companies have a Facebook page or not. Fortunately all of the companies have a Facebook page except one so we have removed this metric from our calculations.

Facebook like Count. Facebook is the leading social network with highest number of members around the world.

We have collected the number of like counts for each of the companies. The maximum like count is for Turkcell and the count is 2.747.255. The minimum value is 0 for the company without the Facebook page. The average value for the Facebook like count is 273.693 and the reason of high standard deviation can be related to the Facebook campaigns of some companies. For example the highest Facebook like Count Company is a well-known telecom company with the Facebook campaigns.

Facebook Shares is another indicator that is the count of the shares of the web site of the company. The value is fetched from Facebook and the higher number of shares is considered as a positive indicator for the company web site. Unfortunately the numbers available for public access on Facebook is limited with last month. So the number of shares are only limited with last 30 days. The average share count is 211 and the maximum count is 1969 for Turkcell.

Tweets parameter is the count of tweets mentioning about the web site of the company. Again, similar to the Facebook shares, the publicly available tweets are limited. Maximum number of tweets is 276 for Halkbank and the average number is 22.

Linked-in Follower Count: The number of people following company in the Linked-in. Again there are several companies without linked-in company page and they are considered as 0 followers. The highest number of followers is 68,114 for Turkcell, cellular phone operator.

C. Web 2.0

Web 2.0 statistics are built on the Wikipedia statistics.

Wikipedia Page Views: This parameter indicates the number of views for the Wikipedia entry of the company. Only one of the top 30 companies in Turkish stock market, does not have Wikipedia entry, so it is considered as 0 page views and rest 29 have the entries. The maximum page view is 12,259 for Turkish Airlines.

Wikipedia Language Count: This parameter indicates the number of different language entries. Wikipedia supports 287 different languages and some of the companies have entries in multiple languages. For example, the maximum language entry is for Turkish Airlines with 46 different languages.

D. Love-Marks

Hate-marks. There are some web pages in Turkish, who collects the hate-marks from customers. The customers create a user account with declaring their true identity and they can write about their complaints to the web page. The company representative can connect to those web pages also and answer the complaints. We have also included the number of complaints as a hate-mark and taken into account as negative reputation parameter. Again some of the companies do not have any entry, which most of them are operating B2B and have only a few customers. On the other hand the highest number of hate-mark is 18964 for Garanti Bank.

Love-marks. Same web sites, who are collecting the hate-marks are also collecting the love-marks from customers. Users can leave their 'thanks' to the company via the same web pages. Besides the companies without any entry the highest number of love-mark is 822 again for Garanti Bank.

IV. NORMALIZATION

In the normalization phase, the collected web indicator values are normalized via min-max normalization [19].

$$N_{\rm MinMax}(x) = \frac{x - {\rm Min}}{{\rm Max} - {\rm Min}}$$

The normalized value is calculated by the subtraction of the minimum value of the series from the sample and dividing the subtraction to the distance between minimum and maximum values of the series.

The reason of normalization is getting comparable values for each of the indicators. For example, some of the web parameters have values up to millions while some are only limited to 100. For this reason we need a common scale for all of the parameters and we have implemented the min-max normalization for each of the parameters where the result is between 0 and 1.

Another problem in combining multiple parameters into a single metric is the effect of parameters as positive or negative direction. For example the Alexa ranking of a web site can be considered as a negative directed effect on the combination, since the better reputation comes from smaller rankings. As a solution we have calculated the inverse of these indicators by multiplying with -1. Which means a subtraction in the final decision in fact.

So the total score is calculated with below formula.

Group Index =
$$\frac{\sum_{0}^{C} N_{x} - \sum_{C}^{K} N_{y}}{C}$$

The Group Index is calculated with the summation of negative indicators subtracted from the summation of positive indicators divided by the count of positive indicators "C". The "K" symbol in above formula stands for the total number of indicators which is the summation of positive and negative indicator counts.

The group index is built over the related parameters for the current group. For example the social media group is built over the parameters related to the Facebook, Linked-in or Twitter only.

After calculating each of the group, the average of all four groups is calculated to find out the final Internet interface competition index for the company.

Internet Interface Competition =
$$\frac{\sum_{0}^{4} SG_x}{4}$$

Each of the special group (SG) is summed up and divided by 4 to calculate the average.

V. RESULTS

This section holds the details of the normalized index values. There are 4 groups of indexes, which are listed as below:

- Web Page Index
- Social Media Index
- Web 2.0 Index
- Love-Mark Index



Fig. 2. Web pages competition index of 30 companies.



Fig. 3. Social media competition index of 30 companies.



Fig. 4. Web 2.0 (Wikipedia) competition index of 30 companies.



Fig. 5. Love-mark competition index of 30 companies.

Fig. 2 to Fig. 5 demonstrates each of the above indexes. The company numbers in x-axis are unique and for each of the graph the company number is given in the same order. For example, the first company appears always on the first order.

The final web competition index is built on the integration of these four indexes [20].

After calculating each group of index, the four groups are integrated into a single index and this index is accepted as the final competition indexed based on the Internet interfaces statistics.

The properties of data set are displayed in Table I.

TABLE I: PROPERTIES OF THE INDEX VALUES	
Mean (µ)	0.454
Maximum	1
Minimum	0.132
Standard Deviation (σ)	0.214
Total Number of Companies	30

The distribution of the company computation index is given as a separate figure.



In Fig. 6, the *x*-axis holds a unique number for each of the company and all 30 companies are demonstrated on the figure, while the y-axis demonstrates the normalized Internet interface competition index value of the company. The companies are sorted via their competition index values and the exact values are given in the appendix.

VI. CONCLUSION

Information and communication technologies have an increasing impact on all aspects of the companies. Most of innovative technologies are affecting the success of the companies while some are transforming the business model of the companies.

In this study, the effect of information and communication technology implementation and usage is researched from the view of customer level. A customer can interact the company via the web page of company, social media pages of company, blogs about company or Wikipedia entries of company. We have collected statistics from all these resources for the most prestigious 30 companies, which are quoted to the Istanbul Stock Market (BIST30), and normalized them into a single value.

As a result we have first time publishing the ICT reputation of top 30 companies in Turkish Stock Market via 17 different parameters, which are collected from 11 different independent sources.

The study can be a baseline for further studies about e-reputation, social CRM or new media reputation management.

REFERENCES

- M. E. Porter, "Location, competition, and economic development: local clusters in a global economy," *Economic Development Quarterly*, vol. 14, no. 15, pp. 15-34, Feb. 2000.
- [2] M. E. Porter, Competitive Advantage: Creating and Sustaining Superior Performance, New York: The Free Press, 1985.
- [3] P. H. Andersen, "Relationship marketing and brand involvement of pro-fessionals through web-enhanced brand communities: The case of Coloplast," *Industrial Marketing Management*, vol. 34, no. 1, pp. 39-51, Jan. 2005.
- [4] J. H. McAlexander, J. W. Schouten, and H. F. Koenig, "Building brand community," *Journal of Marketing*, vol. 66, no. 1, pp. 38-54, 2002.
- [5] E. V. Hippel, Democratizing Innovation, MA: The MIT Press, 2005.
- [6] P. Kotler and J. A. Caslione, *Chaotics: The Business of Managing and Marketing in the Age of Turbulence*, New York: AMACOM Books, 2009.
- [7] B. E. Roe, M. T. Batte, and F. Diekmann, "Competition between local dealerships and internet markets: The role of local relationships, risk

tolerance, and trust in used farm machinery markets," *Agribusiness*, pp. 1–19, Oct. 2013.

- [8] P. Kotler and J. C. Westman, "What CEOs need to know and do about marketing," *Leader to Leader*, vol. 42, pp. 20-28, 2006.
- [9] M. R. Habibia, M. Larochea, and M.-O. Richard, "Brand communities based in social media: How unique are they? Evidence from two exemplary brand communities," *International Journal of Information Management*, vol. 34, pp. 123-132, Jan. 2014.
- [10] H. J. Schau, A. M. Muniz, and E. J. Arnould, "How brand community practices create value," *Journal of Marketing*, vol. 73, no. 5, pp. 30-51, Sep. 2009.
- [11] A. S. Bharadwaj, "A Resource-based perspective on information technology capability and firm performance: an empirical investigation," *MIS Quarterly*, vol. 24, no. 1, pp. 169-196, Mar. 2000.
- [12] S. E. Seker *et al.*, "Ensemble classification over stock market time series and economy news," in *Proc. IEEE Int. Conf. on Intelligence and Security Informatics*, 2013, pp. 272-273.
- [13] S. E. Seker, K. Al-Naami, and L. Khan, "Author attribution on streaming data," in *Proc. 2013 IEEE 14th International Conference* on Information Reuse and Integration, pp. 497-503, Aug. 2013.
- [14] S. E. Seker, O. Altun, U. Ayan, and C. Mert, "A novel string distance function based on most frequent K characters," *Int. J. of Machine Learning and Computation*, vol. 4, no. 2, pp. 177-183, Apr. 2014.
- [15] J. A. Oravec, "The transparent knowledge worker: weblogs and reputation mechanisms in KM systems," *International Journal of Technology Management*, vol. 28, no. 7-8, pp. 767-775, Dec. 2004.
- [16] S. Javanmardi, C. Lopes, and P. Baldi, "Modeling user reputation in wikis," *Statistical Analysis and Data Mining*, vol. 3, no. 2, pp. 126-139, April 2010.
- [17] S. E. Seker, "Web spider performance and data structure analysis," in Proc. Semantic Web and Web Services, 2012, pp. 73-77.
- [18] S. E. Seker, "Performance evaluation of a regular expression crawler and indexer," in *Proc. Internet Computing*, 2012, pp. 33-39.
- [19] M. L. Arslan and S. E. Seker, "Web based reputation index of Turkish universities," *International Journal of E-Education E-Business E-Management and E-Learning*, vol. 4, no. 3, pp. 197-203, 2014.
- [20] S. E. Seker, Y. Unal, Z. Erdem, and H. E. Kocer, "Ensembled correlation between liver analysis outputs," *International Journal of Biology and Biomedical Engineering*, vol. 8, pp. 1-5, 2014.



Sadi Evren Seker has completed his undergrad, graduate and PhD. degrees in the Computer Science and Engineering Department. He has studied in natural language processing and artificial intelligence subjects during his education. He also did a post-doc study in the Computer Science Department at UT Dallas about streaming data mining and social networks. He is currently working as an academic staff in Istanbul Medeniyet University, Business Department,

Management Information System Major Program and his active research topics are business intelligence, data mining and social networks. Sadi Evren Seker has numerous peer-reviewed papers, books and patents. He is an IEEE member and senior member of IEDRC.



Bilal Çankır was born in Istanbul in 1985. He applied to a MA program (international quality management) at Marmara University. He finished this study at 2010. He's pursuing the PhD degree at Istanbul University in management since 2011 autumn. He is currently working at Kirklareli University, Faculty of Economics and Administrative Sciences in business administration area since August 2010. He is interested in management, organizations, and

organizational behaviour.



Mehmet Emin Okur has completed his undergrad, master and doctorate educations on management and organizations discipline in Marmara University. He has studies on human resources management, management and organization and industry relationship. He has advised more than 50 master and doctorate thesis. He also has many books and peer reviewed papers published in his research area.