# REPEAT RESEARCH AND COMPARISON OF CZECH, SLOVAK AND SWISS PRODUCT INNOVATION ORIENTED FIRMS' COMMUNICATION IN SOCIAL MEDIA

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## Abstract

The objective of the research described in this article is a repeat analysis and comparison of social media communication channels used in Czech, Slovak and Swiss product innovation-oriented companies, where the Swiss set of companies is used as a benchmark. The research is conducted using the same methodology as previous research described in Chlebovský (2015). The use of the same methodology allows comparison of the both research results and discussion on the development of social media use in marketing communication of production innovation-oriented companies in selected countries.

The primary research was carried out by scanning the social media use of the selected companies. European company database Amadeus, provided by Bureau van Dijk, was used for company selection in all three countries under the same search criteria. The set of companies researched covers the highest turnover product innovation-oriented companies. Each particular sample set covered 100 companies from each country. The activity of the selected companies on Facebook, YouTube, Twitter, Instagram and LinkedIn were observed and particular metrics were scaled. Microsoft Excel was used for storing, statistical processing and graphic outputs of the research. The hypotheses formulated were statistically tested and the results confirmed. In order to confirm or reject normal data distribution, the Anderson-Darling Normality Test was performed through all three sample sets. This test rejected normal data distribution for all three data sets. The non-parametric Mann-Whitney U test was then used to test the hypothesis.

Evaluation of the results in comparison with previous research shows an increase in use of social media in communication of Czech and Slovak companies. Hypothesis tests show that Czech product innovation-oriented companies are statistically equal in activity and success in communication through social media compared to the Swiss benchmark. Slovak companies are still behind the Swiss benchmark.

Keywords: social media, marketing communication, interactive web communication, marketing communication mix, market orientation, e-marketing, digital media marketing

## INTRODUCTION

Internet marketing has become one of the key communication tools used by companies. The development of social media started with technological improvements allowing bidirectional communication between web content publishers and content users, so-called web 2.0 (Akrimi and Khemakhem, 2012). Media that creates an internet environment allowing effective content sharing between users is called social media (Janouch, 2010). Social media allows users to maintain social contact with others in the network. So-called socializing can be used on a private basis but can also be used by companies within their communication with stakeholders (Shih, 2010). An important fact is also that there is no possibility of controlling the content shared by other users on social media (Bednář, 2011). This becomes more and more important in relation to recent socio-political cases (Anduiza *et al.*, 2014).

An important factor is conformity of the communication tools used with increased demand on product customization. Here the situation has changed dramatically within the past few decades due to globalization of the business environment. Increased competitiveness in this environment increased the focus on customers' requirements (Franceschini *et al.*, 2015) and relationship processes (Tuli *et al.*, 2007). Thus, the new scarcity can be seen in superior customer knowledge (Kellen, 2003) and the ability to offer solutions (Biggemann *et al.* 2013). Efforts towards customer requirement knowledge led to the rapid development of relationship marketing and customer relationship management – CRM (Payne and Frow, 2005). CRM is a great help to companies in increasing their business competitiveness.

These changes are connected with general digitization of the business environment. Rapid technological development over the past few years has offered more ways to increase production flexibility in a higher number of production sectors. This will soon also lead to increased levels of product customization in higher quantity production sectors. (Chlebovský, 2016). Firms now also have access to a wide range of new digital tools that can be utilized for marketing purposes and which have made marketing more measurable (Russell, 2010).

Social media is playing an increasingly stronger role in marketing communication not only in consumer markets but also within the B2B sector. Thus, there is an increasing number of publications related to social media use in the marketing

communication of B2B companies. Brennan and Croft (2012) describe how large B2B companies were extensive users of almost all the mainstream social media channels but at the same time there is a significant gap between U.S. based companies and the rest of the World. Järvinen *et al.* (2012) show that despite interest in social media, companies continue to focus on one-directional communications with established digital tools. This confirms the results of the author's previous research published in Chlebovský and Plšek (2013) and Chlebovský (2015). Recent researches also show influence of social media to brand perceiveness. Barger and Labrecque (2013) see long-term social media objectives concerned less with generating revenue and more with creating brand equity and building brand relationships. Schivinski and Dabrowski (2016) show that both brand equity and brand attitude measured on Facebook have a positive influence on purchase intention.

Recent research shows that adoption of social media is significantly affected by organizational innovativeness and perceived usefulness (Siamagka *et al.*, 2015). Research also shows an increased use of social media in communication (Eurostat, 2017) and companies' presence on multiple social media platforms (Michaelidou *et al.*, 2011). Current statistics show that 47 % of EU enterprises used at least one type of social media (e.g. social networks, blogs, content-sharing sites and wikis) in 2017, with more than eight out of ten of these businesses (84 %) using such applications to build their image and to market products (Eurostat, 2017).

The research presented in this article follows two previously published pieces of research (Chlebovský and Plšek, 2013) and (Chlebovský, 2015). The results of that research correspond to the aforementioned international research within the Czech business environment. Chlebovský and Plšek (2013) show that the majority of respondent companies perceive that social media use can help to get highly effective and rapid feedback from all stakeholders as well as improving communication targeting. They also see good future prospects for social media use in marketing. But on the other hand responses and statistical tests show that the majority of companies are using social media in an old-fashioned style – as a one-way communication channel from the company to customers.

Chlebovský (2015) shows that Swiss product innovation-oriented companies are more active and successful in communication through social

media compared to Czech and Slovak product innovation-oriented companies. Slovak companies especially are significantly behind the Swiss benchmark. Swiss product innovation-oriented companies do not concentrate on just one type of social media, but use multi-channel opportunities. The most popular are Facebook and LinkedIn but very widely used are also Twitter and YouTube.

## MATERIALS AND METHODS

The main objective of the recent research is repeated comparison of the Czech, Slovak and Swiss product innovation-oriented firms' communication on social media. The research is conducted using the same methodology as in Chlebovský (2015) to receive fully comparable results. The use of the same methodology allows comparison of the both research results and discussion on the development of social media use in marketing communication of production innovation-oriented companies in selected countries. The only change was comparing Instagram use instead of Google+. The reason for this methodological change is the highly increasing popularity of Instagram use and at the same time the decreasing popularity of Google+ (Statista.com, 2018).

Based on previous research and actual experience, the following research questions were formulated:

- Q1: Are the actual communication activities of Czech and Slovak product innovation-oriented companies in social media at the same level as the activities of Swiss companies?
- Q2: Do the Czech and Slovak product innovation-oriented companies show improvement in social media use compared to previous research?

Based on the questions, respective zero and alternative hypotheses were formulated, separately for Czech and Slovak product innovation oriented companies:

- H10: Swiss product innovation-oriented companies are more active in communication through social media compared to Czech companies.
- H11: Czech product innovation-oriented companies are equal in activity in communication through social media compared to Swiss companies.
- H20: Swiss product innovation-oriented companies are more active in communication through social media compared to Slovak companies.

- H21: Slovak product innovation-oriented companies are equal in activity in communication through social media compared to Swiss companies.

The research data was collected in July and August 2018.

The defined goal of the research is to analyze and compare the use of social media communication channels in Czech, Slovak and Swiss product innovation-oriented companies. Swiss companies are well known as highly effective product innovators. Companies registered in Switzerland are statistically proven as European leaders in product innovation orientation. Switzerland has the highest number of patents per million population (WIPO, 2015). Thus a set of Swiss companies was used as a benchmark in both the previous and current research.

The research was carried out by observing the activity of the selected companies on social media. The European company database Amadeus, provided by Bureau van Dijk, was used for the company selection in all three countries under the same search criteria.

Since patent statistics are widely used as a valid metric and indicator of product innovation orientation of the company, it was used within the selected search strategy. Database searching was processed for each country in the following four steps:

1) All active companies and companies with an unknown situation
2) Region/Country/region in these countries: Czech Republic/Slovakia/Switzerland
3) Number of registered patents: Top Fourth Quartile
4) Operating revenue (Turnover) (th. EUR): Last available year, Top 100

According to Yamane (1967) two basic criteria are needed to determine the appropriate sample size: the level of precision and confidence level. In socio-economic sciences the confidence level $\alpha = 0.05$ is usually used. For the purposes of this paper the level of precision +/– 10 % was used. The confidence level is $\alpha = 0.05$. On the basis of these criteria the 100 companies are the appropriate sample size in relation to the size of population. Each particular sample set thus covered 100 companies from each country. All these three sample sets were processed within the research.

When it comes to the industry structure of the selected companies, the majority of the companies in all three countries is focused on

industrial production (66 % in the Czech Republic, 70 % in Slovakia and 50 % in Switzerland). Machine building and engineering is mostly covered by the selected Czech and Slovak companies. The industry structure of the selected Swiss companies moved, compared to previous research, more towards pharmaceuticals, the food industry and also industrial automation.

Limitations of the search strategy are primarily found in the fact that some of the companies do not publish their financial data. Especially in Switzerland, where financial data publishing is not compulsory for private companies.

Following metrics were used to measure activity of the companies on social media:

The first metric always shows whether the respective social media scanned is used at all by the company independent to its activity. The second metric indicates the frequency of use and thus whether the company is using social media actively. The third and fourth metrics respectively indicate the level of communication success of the company through the social media scanned.

In order to compare not only the regular activity of the scanned companies on social media, metrics indicating communication success were used while scanning the activity of product innovation-oriented companies on social media. Thus the number of fans, followers or employees (LinkedIn) were scanned for each selected company and respective social media. The sum of all points gained by each respective company gives the social media activity rate.

The sum of the points gained by a company gives the social media activity rate. The theoretical maximum that can be gained by a company is 52 points.

The social media activities of every company selected were observed on the internet and a particular metric value was recorded in the MS Excel evaluation sheets. Besides activity on

I: *Used social media metrics*

| social media | Internet domain | Used metrics and scales |
|---|---|---|
| Facebook | www.facebook.com | Is Facebook used for communication?: Yes = 1; No = 0 |
| | | Up-to-date information (not older than 3 months) on Facebook?: Yes = 1; No = 0 |
| | | Number of fans of the Facebook pages: less than 100 = 0, 100 to 1000 = 1, more than 1000 = 3, more than 10000 = 5, more than 100000 = 7 |
| Twitter | www.twitter.com | Is Twitter used for communication?: Yes = 1; No = 0 |
| | | Up-to-date information (not older than 3 months) on Twitter?: Yes = 1; No = 0 |
| | | Number of followers on Twitter: less than 100 = 0, 100 to 1000 = 1, more than 1000 = 3, more than 10000 = 5, more than 100000 = 7 |
| YouTube | www.youtube.com | Is YouTube used for communication?: Yes = 1; No = 0 |
| | | Up-to-date information (not older than 3 months) on YouTube?: Yes = 1; No = 0 |
| | | Number of subscribers on YouTube: less than 100 = 0, 100 to 1000 = 1, more than 1000 = 3, more than 10000 = 5, more than 100000 = 7 |
| Instagram | www.instagram.com | Is Instagram used for communication?: Yes = 1; No = 0 |
| | | Up-to-date information (not older than 3 months) on Instagram?: Yes = 1; No = 0 |
| | | Number of followers of the Instagram pages: less than 100 = 0, 100 to 1000 = 1, more than 1000 = 3, more than 10000 = 5, more than 100000 = 7 |
| LinkedIn | www.linkedin.com | Is LinkedIn used for communication?: Yes = 1; No = 0 |
| | | Up-to-date information (not older than 3 months) on LinkedIn?: Yes = 1; No = 0 |
| | | Number of followers of the LinkedIn pages: less than 100 = 0, 100 to 1000 = 1, more than 1000 = 3, more than 10000 = 5, more than 100000 = 7 |
| | | Number of company employees registered on LinkedIn: less than 100 = 0, 100 to 1000 = 1, more than 1000 = 3, more than 10000 = 5, more than 100000 = 7 |

Source: author

the selected social media, the basic web pages of the companies were also observed. The data gained stored in MS Excel were further processed in order to test the given hypotheses. In order to confirm or reject normal data distribution, the Anderson-Darling Normality Test was performed through all three sample sets. This test rejected normal data distribution, thus the non-parametric Mann-Whitney U test was then used to test the H10 and H20 hypothesis. The results were compared with previous research.

## RESULTS

As mentioned before, the theoretical maximum that one company can reach from its scanned social media activity in the social media activity rate is 52 points. The following Tab. summarizes the results:

In order to confirm or reject normal data distribution, the Anderson-Darling Normality Test was performed through all three sample sets. This test rejected normal data distribution for all three data sets.

The non-parametric Mann-Whitney U test was then used to test the H10 and H20 hypothesis separately comparing Czech and Slovak companies' sample sets with the Swiss benchmark. The test is based on the rank of values and compares the means of selected data sets at the level of significance 0.05.

The test of the Slovak companies' sample set compared to the Swiss benchmark resulted in the Z-Score of -7.85834 and the p-value < 0.00001. The result is significant at $p < 0.05$ and is also significant at $p < 0.01$. Hypothesis H20 is confirmed for Slovak companies' sample set, meaning Swiss product innovation-oriented companies are more active in communication through social media compared to Slovak innovation-oriented companies.

The test of the Czech companies' sample set compared to the Swiss benchmark resulted in the Z-Score of -1.91591. The p-value 0.05486. The result is not significant at $p < 0.05$. Hypothesis H10 is rejected in favor of H11 for Czech companies' sample set. This means Czech product innovation-oriented companies are equal in activity in communication through social media compared to the Swiss benchmark.

Besides the statistical results and hypothesis testing, the following comments can be made out of the data received.
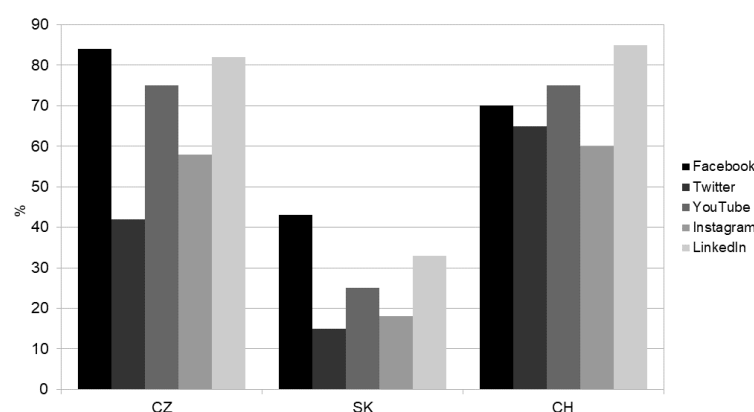
Active use of social media by the companies selected and observed varies from country to country. 95 % of the selected companies in both Switzerland and the Czech Republic are actively using at least one observed social media. In Slovakia it is only 56 %.

Two or more of the scanned social media are actively used by 90 % of the Czech and Swiss

II: *Social media activity rate of product innovation oriented companies by country in 2018*

| Country | Maximum | Minimum | Average | Median | Variance | st. deviation |
|---|---|---|---|---|---|---|
| **Czech Republic** | 42 | 0 | 16.00 | 14 | 103.21 | 10.16 |
| **Slovakia** | 34 | 0 | 5.32 | 4 | 51.48 | 7.18 |
| **Switzerland** | 48 | 1 | 19.54 | 18 | 161.92 | 12.72 |

Source: author



1: *Active use of various social media in product innovation oriented companies by country*
Source: author

selected companies, but only by 44 % companies out of the Slovak sample set.

The most popular social media are Facebook and LinkedIn within the sample sets of companies in the Czech Republic and Slovakia. LinkedIn and YouTube are the most popular within the Swiss benchmark. Active use of scanned social media in all three countries is shown in Fig. 1. It shows that the Slovak companies observed are significantly behind the Swiss benchmark. This confirms the performed statistical tests of the hypothesis. The research also confirms the high popularity of LinkedIn in company communication.

The research also shows that Swiss companies are using social media in a complex way – a minimum of 60 % of the companies observed use each form of social media tested in the research. Czech companies are not yet using Twitter that actively.

## DISCUSSION

The research described in this article was performed in order to compare the active use of social media in marketing communication of product innovation-oriented companies in the Czech Republic, Slovakia and Switzerland, where the Swiss set of companies was used as a benchmark. This was repeat research, thus the research methodology was intentionally the same as in the author's previous research published in Chlebovský (2015). The same methodology allows not only comparison of the actual activity of the selected companies in social media but also comparison of the previous research data with the current set. When comparing the results of the actual research with the previous one, the following statements were formulated.

Statistical processing and hypothesis testing of the actual data show, in comparison with previous research, that both Czech and Slovak product innovation-oriented companies increased their active use of social media communication.

Active use of social media communication of the Czech sample set of companies is now statistically confirmed as equal to the Swiss benchmark. Slovak product innovation-oriented companies are still significantly behind the level of active use observed within Swiss and Czech companies. At the same time there can be seen recognizable increase in social media communication use in Slovak companies as well.

Research data also shows that the relative importance of Facebook use within the Swiss sample set is decreasing. Not only LinkedIn but also YouTube is used by a higher percentage of the companies observed.

Based on the comparison with the Swiss benchmark, it is recommended that Czech companies increase their focus on Twitter use in marketing communication. Twitter is a very good tool for short news items and short press release type messages. It is of a major importance for the companies to establish effective bidirectional and multichannel communication on the internet. Social media is the proper tool to be used. As shown on the results of Swiss benchmark it is very important to use not only one social media but use actively and in parallel more social media channels to gain multiplication effect of the interactive communication with various stakeholder groups.

Fig. 2 shows the comparison of active use of various social media by country in both sets of research – Chlebovský (2015) and recent research.
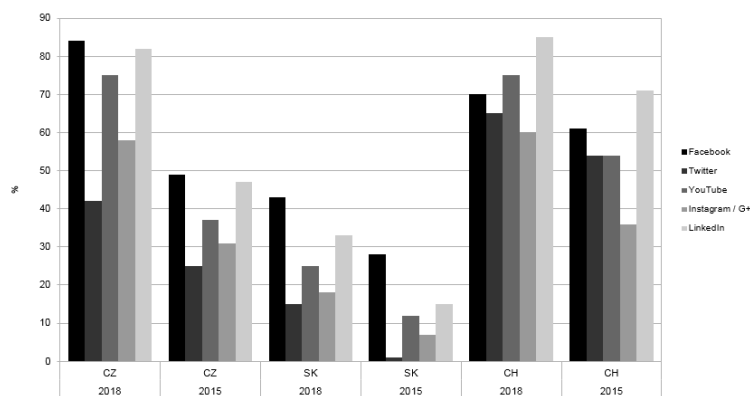


2: *Active use of various social media in product innovation-oriented companies by country – comparison of the results of current and previous research*
Source: author

## CONCLUSION

The goal of the research described in this article was to analyze and compare the use of social media communication in Czech, Slovak and Swiss product innovation-oriented companies, where the Swiss set of the companies was used as a benchmark. This was repeat research conducted intentionally under the same methodology as presented in Chlebovský (2015). This allows comparison of the social media use in communication of the product innovation oriented companies in 2015 and 2018. Primary research was conducted by observing the social media activity of the companies selected. Companies for the sample sets in all three countries were selected using European company database Amadeus, provided by Bureau van Dijk. The same search criteria, where the number of registered patents was used as a product innovation orientation indicator were used in both original and repeat researches in all three countries.

The activity of the selected companies on Facebook, YouTube, Twitter, Instagram and LinkedIn was observed and particular metrics were scaled. Microsoft Excel was used for storing, statistical processing and graphic outputs of the research. The results were compared to the results of previous research and the differences in results were discussed.

The test of the Czech sample set results confirmed that there is no statistically significant difference in their active social media use compared to the Swiss benchmark. The test of the Slovak sample set results confirm a persistent statistically significant difference in social media use compared to the Swiss benchmark.

In comparison with the original research, the results show that both Czech and Slovak product innovation-oriented companies have increased their active use of social media communication.

The research data also shows a decrease in the relative importance of Facebook use within the Swiss sample set and a dynamic increase of YouTube and Twitter use.

A general recommendation for Slovak companies is improvement of their social media activity to get closer to their Swiss benchmark. This could help them to stay competitive in global markets. A recommendation for Czech companies, in comparison with the Swiss benchmark, is an increased focus on Twitter use in marketing communication.

As presented in (IBM, 2018), major global marketing managers are aware of the increasing importance of sharing customer experience and increasing the importance of offer personalization. Use of social media in communication is a respected tool to support this process.

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