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# Digital Presence as Competitive Advantage in Brazilian Banks

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This pilot study analyzes the digital presence as a relevant dimension to build the competitive advantage of Brazilian banks, which reinforces findings of previous studies. The study also introduces the Digital Presence Index (DPI) to consolidate the digital metrics, a relevant issue to strategical decision making. The research used a qualitative and quantitative approach. Specialists were interviewed, and companies joined workshops to provide a list of relevant digital metrics. Secondary researches and databases provided a historical series of banks business results and digital presence metrics. Multiple linear regression and factorial analysis methods were used to verify the relation of the digital metrics on business outcomes. This study contributed to expand the literature of multivariate analyses and data visualization to strategical decision making applied to Digital Analytics. These paper contributions can improve the decision-making process of marketing analysts, business executives, and internet professionals. Its originality highlights are the application of multivariate analysis to measure the impact of digital variables to business results in Brazilian Bank market and a new index to consolidate digital metrics.

**Keywords:** information systems; competitive intelligence; digital metrics; digital presence; digital marketing.

## Presença Digital como Vantagem Competitiva em Bancos Brasileiros

Este estudo piloto analisa a presença digital como dimensão relevante para a construção da vantagem competitiva dos bancos brasileiros, o que reforça achados de estudos anteriores. O estudo também apresenta o Índice de Presença Digital (DPI) para consolidar as métricas digitais, questão relevante para a tomada de decisões estratégicas. A pesquisa teve abordagem qualitativa e quantitativa. Os especialistas foram entrevistados e as empresas participaram de workshops para fornecer uma lista de métricas digitais relevantes. Pesquisas e bancos de dados secundários forneceram uma série histórica de resultados de negócios de bancos e métricas de presença digital. Métodos de regressão linear múltipla e análise fatorial foram usados para verificar a relação das métricas digitais sobre os resultados de negócios. Este estudo contribuiu para expandir a literatura de análises multivariadas e visualização de dados para tomada de decisão estratégica aplicada a Digital Analytics. Essas contribuições em papel podem melhorar o processo de tomada de decisão de analistas de marketing, executivos de negócios e profissionais da Internet. Seus destaques de originalidade são: a aplicação da análise multivariada para medir o impacto das variáveis digitais nos resultados dos negócios no mercado bancário brasileiro e um novo índice para consolidar as métricas digitais.

**Palavras-chave:** sistemas de informação; inteligência competitiva; métricas digitais; presença digital; marketing digital.

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## Introduction

Decisions based on big data will be the basis of competition and business growth, increasing productivity and creating significant value for the global economy (DEMCHENKO et al., 2013; MCAFEE; BRYNJOLFSSON, 2012; MCGUIRE et al., 2012). Digital Analytics (DA) has the potential to transform Big Data of digital presence in competitive advantage (CHEN; CHIANG; STOREY, 2012; CUTRONI, 2012; KAUSHIK, 2009) fostering the companies' sales, brand recall, profit and market value (HARRISON, 2013; JÄRVINEN; TÖLLMEN; KARJALUOTO, 2012; MOE; SCHWEIDEL, 2017; PAUWELS et al., 2012; WESTERMAN et al., 2012; WILSON, 2010).

Although, only a few companies can analyze the increasing amount of information (KAUSHIK, 2007; GOES, 2014). A major challenge is digital metrics are not aligned with the business strategy (KAUSHIK, 2007; OLIVEIRA, 2013; PHIPPEN; SHEPPARD; FURNELL, 2004; RUHI, 2014). The excess of metrics and reports difficult business insights (ARUN; DACIN; PATTICHIS, 2006; PHIPPEN et al., 2004; STERNE, 2010). Executives are losing opportunities to be more strategical (PETERSON, 2006; JÄRVINEN; HEIKIKKI, 2015) and innovative with DA (MOE; SCHWEIDEL, 2017). The ideal digital KPIs should address corporate themes as strategic planning (KAPLAN; NORTON, 1997), innovation based on customer knowledge (GIBBERT; LEIBOLD; PROBST, 2002), quality management (DAVIS; AQUILANO; CHASE, 2001) and returns on investments from communication (YANAZE; FREIRE; SENISE, 2010).

The Digital Analytcs literature seems to not cover these issues because the studies focus technical rather than business issues. Few authors produced exploratory investigation on how Social Media Analytics – buzz and network analyses - can create value to companies. (BASILI; CROCE; CASTELLUCCI, 2017; LEE, 2018; LOVETT, 2011; SPONDER, 2012; STERNE, 2010; RUHI, 2014; WITTWER et al., 2017). Other few authors focus on the contribution of Web Analytics, the analyze of the consumers paths on websites to optimize site usage (CUTRONI, 2012; JACKSON, 2009; KAUSHIK, 2009; NAKATANI; CHUANG, 2011; PARK et al., 2010; PETERSON, 2006; PHIPPEN et al., 2004). Recent researches focus on the integration of social and web analytics metrics to drive marketing results (JÄRVINEN; TÖLLMEN; KARJALUOTO, 2012; JÄRVINEN; HEKIKKI, 2015; KENT et al., 2011; ZHUKOV; KOMAROV, 2017).

Despite advances through predictive analytics are considered the future of DA (RUHI, 2014), there are few studies using statistical models to analyze the impact of digital metrics on business outcomes. Kimura, Contreras Pinochet and Azevedo (2016) found some strong correlations between digital metrics and automotive sales in Brazil.

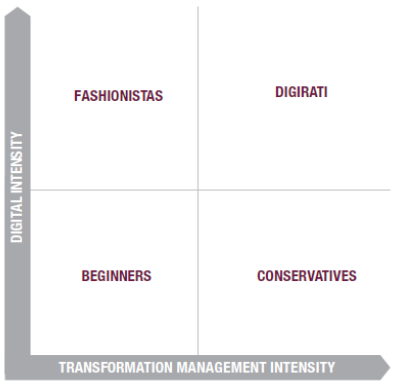
This paper has the pretention to expand the literature of digital metrics modeling and strategic decision making, therefore, it will propose: (i) the Digital Presence Index (DPI), a consolidation of impacting digital metrics based on multivariate analyses (JOHNSON; WICHERN, 2002); (ii) a data visualization approach to ease the executives´ decision making using the classic performance-importance matrix (MARTILLA; JAMES, 1977; SLACK, 1994). To do so we implemented a quantitative and qualitative research on the Brazilian banks industry.

## 2. Theoretical Framework

### 2.1. The impact of digital presence on companies' performance

Westerman et al. (2012) observed that the most digitally mature companies are more profitable than their industry competitors. This digital maturity is compounded by two variables: (i) digital intensity, investment in technology-enabled initiatives to change how companies operate; (ii) transformation in management intensity - leadership capabilities that are necessary to drive digital transformations in organizations (Figure 1). Based on the performance on these variables the companies are classified in digital maturity: beginners, fashionistas, conservatives and digirati. Beginners have 24% less profit than other players on the same industry, fashionistas 11% less profit. On the other side, conservatives have 9% more profit and digiratis perfom 26% better than concurrency. These results indicate the relevance of the transformation in management to impact company results. The investment on digital initiatives without business transformation can cause losses to the company.

**Figure 1. Impacts on profitability depends on type of digital maturity (Adapted from Westerman et al., 2012)**




A critical capability to digital transformation is the alignment between business strategy (MINTZBERG; LAMPEL, 1999) and IT contributes to the company competitive advantage (ROCKART, 1979; PORTER; MILLAR, 1985; PORTER, 2001; LAURINDO, 2008). This capability depends on the alignment maturity degree (LUFTMAN, 2003), and how this alignment occurs (HENDERSON; VENKATRAMAN, 1993; BUCHANAN; LINOWES, 1980). Technology must be linked to the critical success factors of the company in order to be effective (ROCKART, 1979). The alignment between strategy and IT is reflected in the links between the activities inside and outside the value chain, and can following four perspectives: strategy execution, technological change, competitive potential, and level of service. The Internet allows the value system integration (PORTER, 2001) and the creation of virtual value chains (CHANDRASHEKAR; SCHARY, 1999; RAYPORT; SVIOKLA, 1995). The virtuality transforms the business (ANGHERN, 1997; BOVET; MARTHA, 2001), the organization (VENKATRAMAN; HENDERSON, 1998), and the development of its products and services (MATTOS; LAURINDO, 2008).

Transformations in the competitive environment means that companies must have a specific business model that create value in e-business though four pillars: efficiency, innovation, loyalty and complementarity (AMIT; ZOTT, 2001). The internet allows the development of new products and services together with consumers through co-creation of value (PRAHALAD; RAMASWAMY, 2000, 2004; PRAHALAD; KRISHNA, 2008; GIBBERT et al., 2002; TAPSCOTT; WILLIAMS, 2007). The internet democratizes the means of production and distribution and—at the same time—provides better linkages between supply and demand. These changes allow the development of more segmented markets (long-tail distribution) and enable new forms of competition between companies (BRYNJOLFSSON; HU; SMITH, 2003; ANDERSON, 2006; KIM; MAUBORGNE, 2005). The integration of activities provided by the internet allows more flexible arrangements in the value chain, which can then be set according to demand. These new arrangements defined the marketspace, a new field for competition among companies where companies compete virtually (RAYPORT; SVIOKLA, 1995).

A relevant piece of this marketspace is the digital presence, a broad concept that encompasses company exposure on the internet, whether controlled by the corporation or not (HAJ-BOLOURI; FLENSBURG; SVENSSON, 2014; THIBEAULT, 2012). Interactive marketers define digital presence as a set of channels for consumers on the internet, starting conversations among consumers about brands and companies. These channels are categorized into three levels of media: paid, owned, and earned (PAUWELS et al., 2012; CORCORAN, 2009). Pauwels et al. (2012) observed that paid, owned, and earned media metrics add explanatory power to a sales response model that already includes a mix of marketing actions.

Paid media is an investment on displays adverts, paid research, and sponsorships. Marketing actions impact on customer beliefs, attitudes and awareness, which are further linked with sales (VAKRATSAS; AMBLER, 1999). It can happen through specific marketing actions with short-term market outcomes or building a customer relationship with long-term market outcomes (JÄRVINEN; TÖLLMEN; KARJALUOTO, 2012).

Owned media is controlled by companies and formed through websites, mobile applications, blogs, and social media pages and profiles. Owned media provides to companies a monitored environment to link customer exposure to marketing communication action on a platform to website visits and even customer action such as purchase decision, request for quotation, brochure download or abandonment (WILSON, 2010). Kabadayi and Gupta (2005) and Ellonen et al. (2010) observed the relationship between owned media metrics as website visits and the time spent on the website per visit and the brand loyalty. The loyalty is an important construct in e-business because of customers' easy switching behaviour on the web.

Earned media is the media generated by the consumer. The consumer become the channel through the “buzz” on social media and viral replication of messages (CORCORAN, 2009). The key to the successful development of social media will hinge on marketers’ ability to successfully link social media activity to managerial decisions that affect financial performance (MOE; SCHWEIDEL, 2017). The owned media also includes the trending of a brand in search engines such as Google. This trend represents unaided brand recall (KAUSHIK, 2012; HARRISON, 2013).

## 2.2. Big Data and DA

The information administration area is facing some relevant changes due to Big Data, the phenomenon of processing large volumes of data that traditional tools are not able to handle due to the required speed (DATSKOVSKY, 2013). Big Data characteristics were summarized in 5 V's: volume (size and amount of data); velocity (dynamics of growth and data processing); variety (diversity of sources, forms, and formats of data); value (meanings that can be attributed to the data and the added value offered by such meanings); and veracity (authenticity, origin reputation, and reliability of data) (MCAFEE; BRYNJOLFSSON, 2012; DEMCHENKO et al., 2013).

Datskovsky (2013) states that Big Data can provide competitive advantages to organizations, if it is mined for insights and unnecessary, redundant, obsolete, or trivial information is discarded. McGuire et al. (2012) are more emphatic, stating that Big Data will be the basis of competition and business growth, increasing productivity and creating significant value for the global economy by reducing waste and increasing the quality of products and services.

The transformation of Big Data into value is done using various technologies known as business intelligence and analytics (BI&A). Chen, Chiang and Storey (2012) cites three phases of the BI&A evolution:

- BI&A 1.0: Based on databases and structured content, e.g., relational databases, data warehousing, extract, transform, load (ETL), online analytical processing (OLAP), dashboards, scorecards, data mining, and statistical analysis;
- BI&A 2.0: Unstructured and web-based content, e.g., recovery and extraction of information, opinion mining, web analytics, web intelligence, social network analysis, and space-time analysis;
- BI&A 3.0: Content based on sensors and mobility, e.g., geo-processed analysis, people-centered analysis, analysis relevant contexts, mobility viewing, and human–computer interaction.

DA, formerly named Web Analytics, is a critical research area on the business intelligence and analytics efforts to transform big data in business impacts (CHEN; CHIANG; STOREY, 2012). DA is the use of emergent knowledge generated by the interaction of the consumer with the digital presence instances such as websites, mobile applications and social media for the purposes of increasing business performance (CUTRONI, 2012).

DA is usually associated with other terms on the literature as social media analytics, web analytics and mobile analytics. A search of these terms on the Web of Knowledge (2018) base founded 159 references. The majority belongs to technical categories as Computer Science, Electrical Engineering and Telecommunications. Only 16 of these papers study the application of digital metrics on business themes. An evidence of the novelty of this theme. Analyzing these papers deep our understanding of how executives use digital metrics to decision-making. Four of these studies (ZHUKOV; KOMAROV, 2017; JÄRVINEN; TÖLLMEN; KARJALUOTO, 2012; JÄRVINEN; HEKIKKI, 2015; PHIPPEN et al., 2004) use case study methodology, this approach is used when the aim of the research is to understand a phenomenon (YIN, 2009). The case studies indicate the exploratory stage of the DA researches. Four references (MURPHY, 2010; AMBLER, 2011; MOE; SCHWEIDEL, 2017; TAN,

2017) are literature review, an attempt to conceptualize the DA and its metrics Three papers are dedicated to DA tools avaliation (NAKATANI; CHUANG, 2011; WITTWER et al., 2017; BASILI et al. 2017). Three authors used secondary data of DA tools to produce a quantitative research (KENT et al., 2011, KIMURA et al., 2016; LEE, 2018). Park et al. (2010) used a survey technique and Ruhi (2014) used experts panel. The literature consolidated practical and academic approaches of Web Analytics and Social Media Analytics.

Web Analytics encompass analyses of the web data for purposes of understanding and optimization the web usage, a concept exceeded by the DA definition that incorporate the whole business performance (CUTRONI, 2012). Jackson (2009) analyzed the implementation of a Web Analytics culture and compared it to other web analytics references. Kaushik (2009) focuses on digital metrics accountability and customer centricity. Phippen et al. (2004) and Peterson (2006) takes a more fundamental approach of key performance indicators (KPIs), he emphasizes the use of KPIs to summarize meaningfully compared data. Nakatani and Chuang (2011) used Analytical Hierarchy Process (AHP) to choose the best Web Analytics tool. Park et al. (2010) used the survey technique to investigate the critical factors that leads companies to continue using of Web Analytics services.

Social Media Analytics are related to the "listening" of consumers comments and interactions on social media. Some tools collect this data on social media platforms as Facebook, Twitter and Instagram and consolidate the data in dashboards. Sponder (2012), Lovett (2011) and Sterne (2010) developed a vocabulary of social media to fill the gap between executive's necessities and the monitoring solutions provided by tools vendors. Some authors focused on the analyses of tolls and platforms and analytics implementation, Ruhi (2014) and Wittwer et al. (2017) compared Social Analytics and Business Intelligence approaches. Lee (2018) designed a scenario of Social Media Analytics practices on companies pointing relevant analyzes as sentiment analysis, the application of computational technologies to identify and extract subjective information from vast amounts of user generated content, and social network analysis, the process of analyzing structures of social networks based on social network theory, which seeks to explain how networks operate and analyze the complex set of relationships within a network of individuals or organizations. Basili et al. (2017) focus on the precision of sentiment analyzes delivered by social media monitoring tools.

Zhukov and Komarov (2017), Järvinen, Töllmen and Karjaluoto (2012), Järvinen and Hekikki (2015) and Ken et al. (2011) integrated Web Analytics and Social Media Analytics to evaluate the efforts of marketing communication. This integrated approach is a relevant step to measure the impact of digital metrics to company performance. Ruhi (2014) the future of DA is related to advances through Big Data and Predictive Analytics, but we identified only one paper using regression models to correlate the digital metrics with business outcomes. Kimura et al. (2016) collected data from several DA tools (Similar Web, Alexa, Topsy, Ahrefs Site Explorer, Marketing Grader, Open Link Profiler and Nibbler) to produce an historical series of digital metrics on the automotive industry. They compared these metrics with sales data through linear regression and they found strong correlations between some metrics and car sales.

## 2.3. Strategic marketing decision making with digital metrics

The literature presents a lot of challenges to convert the DA into value A key problem is the DA not aligned with the business strategy (KAUSHIK, 2007; OLIVEIRA, 2013). Phippen et al. (2004) highlight problems in promoting an awareness of Web analytics and how it can be applied to corporate goals, as well as, Ruhi (2014) noticed companies difficulties to align businesses and their Social Media Analytics with the overall strategic objectives of the organization. The literature identified other relevant issues:

- Technical analysis of click stream on the websites not considering the customer as the center of the analysis (KAUSHIK, 2007; ARUN et al., 2006).
- Many web metrics inflating reports increasing the struggle to achieve business insights (ARUN et al., 2006; STERNE, 2010). Web analytics does not just offer a variety of ways to measure digital presence performance: it offers a plethora of metrics. It is causing problems for companies attempting to adopt a DA strategy (PHIPPEN et al., 2004);
- Lack of qualitative data disrupts the decision-making (BUGHIN; SHENKAN; SINGER, 2008; KAUSHIK, 2007);
- The necessity of integration of online and offline data to improve results of corporate endeavors as campaigns and new products (BUGHIN et al., 2008; SHANKAR; YADAV, 2010).

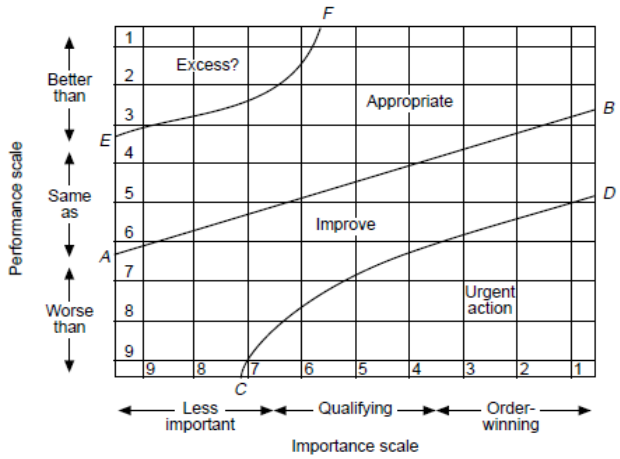
The use of analytics is more effective when the organizational culture favors data-driven decision making, cooperation, and information sharing, which often requires effective change management practices (DAVENPORT, 2013; MCAFEE; BRYNJOLFSSON, 2012). The companies must address some critical factors associated to strategical decision making as strategic planning, innovation, quality control and financial analysis. The strategic planning is essential for company efforts to have clear drivers to get results in aspects of financing, marketing, procedures, as well as innovations and growth. The alignment of DA indicators with a company's strategic planning can boost business (KAPLAN; NORTON, 1997). Järvinen and Heikikki (2015) argues that managers should primarily focus on designing a manageable metrics system that is linked to the firm's top priority marketing objectives instead of adopting a variety of digital metrics. The knowledge generated by customers through social media and websites becomes a source of strategic value, as a company can use this knowledge to improve its processes and innovation (GIBBERT et al., 2002). Social Media Analytics brings opportunities for innovation in several areas: Brand Management, supplementing traditional marketing research; Crisis Management, forecasting social media conversations; Customer Relationship Management through social profiling and targeting; Product Development; and Evaluating of Marketing Actions (MOE; SCHWEIDEL, 2017). The application of quality tools allows a company to establish a cycle of continuous improvements of its processes to achieve excellence in its market. It can also improve the consistency of DA and contribute to continuous improvement of its digital presence (DAVIS et al., 2001). The measurement and continuous improvement of investment in digital communication is the key to financially justifying actions on the web. DA can contribute to

the analysis of returns on investments from communication (YANAZE et al., 2010; MOE; SCHWEIDEL, 2017; JÄRVINEN; TÖLLMEN; KARJALUOTO, 2012).

Despite these potential benefits of DA, the number of digital metrics may be overwhelming, but it should not be viewed as a negative characteristic. The presence of so many metrics means that companies must carefully examine what they want to measure and the reasons why. Each report must be justified, it will reduce the number of irrelevant reports, translating into cost savings for the company (PHIPPEN et al., 2004). The digital metrics must be consolidated in KPIs, ratios and indexes are more usable than raw numbers to decision-making (PETERSON, 2006). The proposed Digital Presence Index (DPI) presented on this paper intends to cover this gap allowing the companies to make decisions related to its digital presence based on a simplified index.

Other corporate difficulty faced by business executives is seeing the digital metrics in strategical dashboards. This type of data visualization is so far from data repository views familiar to analysts (KAUSHIK, 2014). The importance–performance matrix, broadly used for marketing (MARTILLA; JAMES, 1977) and operations management (SLACK, 1994) analyzes, can help executives to make better decisions based on digital metrics. The performance scale compares the company performance with the concurrency and the importance scale measures the relation with business outcomes (Figure 2).

**Figure 2. The importance–performance matrix (SLACK, 1994)**




## 3. Model and Hyphoteses

Based on the Digital Presence construct, we aim to test the hypotheses of Paid Media, Owned Media and Earned Media impact the Business Outcomes. We will test the following hypotheses:

*H1. Paid media is positively related to business outcomes.*

Paid media impacts on customer beliefs, attitudes and awareness, which are further linked with sales (VAKRATSAS; AMBLER, 1999). The administration of the campaigns impacts the ROI and therefore the company profit (YANAZE et al., 2010; WESTERMAN et al., 2005). This hypothesis should be measured considering a reasonable amount of time because the

results can happen through specific marketing actions with short-term or long-term market outcomes (JÄRVINEN; TÖLLMEN; KARJALUOTO, 2012).

*H2. Owned media is positively related to business outcomes.*

The owned media is the environment controlled by the company where the consumers consider purchase, generate leads and even buy services and products (WILSON, 2010). A customer centric website increases the conversion of visits in actions (KAUSHIK, 2009) and thus affects the business KPIs (KIMURA et al., 2016; PETERSON, 2006; PHIPPEN et al., 2004).

*H3. Earned media is positively related to business outcomes.*

The Earned Media is compound by the buzz on social media and brand recall observed in search engines. Social media activity associated to correct managerial decisions affects financial performance (MOE; SCHWEIDEL, 2017). The unaided brand recall in search engines affects the competition and the companies sales (KAUSHIK, 2012; HARRISON, 2013).

## 4. Method

### 4.1. Research design

The research is descriptive in nature, and we used the following methodological procedures: bibliographic research, access to multiple databases, interviews, workshops, and multivariate analysis. We used bibliographic research to explore the concept of digital presence and its variables to exploit its link with business strategy. We interviewed six banking executives, three advertising agencies professionals and two social media researchers to explore digital presence and business-results variables of banks. The interviews were complemented with workshops about e-metrics with marketing executives of 10 companies. These workshops were promoted by the ESPM Media Lab with analysts and executives of digital marketing of the companies. The contacts of the companies are part of an email marketing list of the ESPM faculty. Two workshops occurred in September of 2014. The workshops purposes were increase the knowledge about digital metrics and collect information to propose the Digital Presence Index. Companies of the following industries joined the workshops: real state, educational, social media, publishing, e-commerce, construction, design, television and insurance. The group represents companies of different sizes and business models. In every case, the companies have relevant digital presence.

The interviews and workshops provided a list of common analyses and metrics of digital presence. We searched secondary researches and databases that provide an historical of these metrics. Data on digital-presence and business outcomes of banks was collected from multiple databases, such as the Brazilian Central Bank, ComScore, Google Trends, and Social Bakers. This data was consolidated and was transformed generating a historical series for the year of 2014 of three independent variables and seven dependent variables described on Table 1.

**Table 1: Summary of earned, owned and paid media variables**

| Variable | Data source | Consolidation procedure |
|---|---|---|
| B1 Net Profit<br>B2 Total assets<br>B3 Total deposits | Central Bank of Brazil | Periodicity: quarterly<br>Points of measure: 3<br>Agregation: sum |
| V1 Media Investment<br>V2 Media impressions | ComScore | Periodicity: monthly<br>Points of measure: 9<br>Agregation: sum |
| V3 Average visits per month<br>V4 Visits per visitor | ComScore | Periodicity: monthly<br>Points of measure: 9<br>Agregation: Average |
| V5 Facebook likes<br>V6 Twitter Followers | Social Bakers | Periodicity: daily<br>Points of measure: 1<br>Agregation: None* |
| V7 Searches in Google | Google Trends | Periodicity: daily<br>Points of measure: 270<br>Agregation: Average |

Bn (Independent variables), Vn (Dependent variables).

* Registered only the last day of year representing the total of likers/followers of the page/profile.

Digital media represents an important role to facilitate the relationship between banks and their consumers (SWEENEY; MORRISON, 2004). The Brazilian banking industry reaches 40.6% of Brazilian online users accessed internet banking in 2013 versus 32.7% worldwide (COMSCORE, 2014). Moreover, almost half of all banking transactions happen on a website or mobile application in Brazil (FEBRABAN, 2014). Future studies must include a larger set of companies from different industries.

The Multiple Linear Regression and Factorial Analysis methods were used to verify the relation of the independent and dependent variables of the proposed model (HAIR, 2006; JOHNSON; WICHERN, 2002). Finally, we developed a quantitative model to consolidate and calculate banks' DPI ranking based on these analyses.

Despite efforts to produce a scientific contribution, this research has some limitations:

- the study represents the results from the banking sector, which does not allow generalizations to other industries;
- the historical series is limited to one year, there are few measurement points. This restriction affects the calculus of the beta on the regression model;
- the Brazilian banking market is formed by large companies, small- and medium-sized businesses were not included in this research;

- it was not possibly to monitor the broad historic buzz of banks on the internet due to budget limitations, so we used Google Trends data for searches on Google;
- the number of likes on Facebook is questionable because fake users inflate statistics (KROMBHOLZ; MERKL; WEIPPL, 2012).

### 4.2. Brazilian banks characteristics

To clarify how we can measure the digital presence and business results of the largest Brazilian banks, we need to problematize the concept of digital presence (HAJ-BOLOURI et al., 2014; THIBEAULT, 2012) of banks. This involves categorizing its channels as follows: paid, owned, and earned media (PAUWELS et al., 2012; CORCORAN, 2009). We selected the banking industry due to the immense use of these channels.

Owned media has an important and significant role for banks. About 28 million people use internet-banking applications in Brazil (COMSCORE, 2014). The internet is the main channel for banking transactions (41% of total transactions). According to the Brazilian Federation of Banks, mobile operations comprise 6% of transaction (FEBRABAN, 2014). These numbers show that internet banking is a critical tool for the maintenance of competitive advantage in Brazil. Brazilians use internet banking 8% more than the global average (COMSCORE, 2014). There are some historical reasons to explain this difference. Due to hyperinflation in the 1990s, banks invested in automated teller machines (ATMs) to deal with the huge movements of money from Brazilian bank branches. This platform helped pave the way for other technologies, including internet banking sites. Brazilian consumers trust the security of internet solutions because they are accustomed to performing virtual operations at ATMs.

Brazilian banks are heavy media buyers. They are the third largest industry when it comes to investing in communication in Brazil, buying almost 700 million dollars' worth of media in the first semester of 2014 (IBOPE, 2014). A significant share of this investment is destined to paid online media.

The importance of earned media is fostered by Brazilians' behavior on social media. Brazilians spend 13 hours per month on social networks versus the global average of 6 hours (COMSCORE, 2014). The buzz about banks is expressive, with 1 million tweets mentioning the term "bank" in February 2015 (TOPSY, 2015).

The DPI aims to reinforce this trend by calculating the contribution of each e-metric to business results. The importance of each variable is proportional to the correlation between e-metric performance and business results, and comparisons between a company and other players will form the performance scale of the variables.

### 4.3. Scale and model development

To test the hypotheses of this study, we accessed performance data of banks through the Brazilian Central Bank's website. We collected data on 10 indicators of business results. After interviews with bank executives, we selected three indicators: B1 - Net profit (the net profit generated by banking operations); B2 - Total assets (total assets managed by a bank, which measures size) (EXAME.COM, 2014); B3 - Total deposits (representing the funding capacity of the bank).

This set of indicators of banking results are defined as dependent variables in multivariate analysis (JOHNSON; WICHERN, 2002). Independent variables came from workshops with marketing executives and consulting online researchers, such as ComScore, Social Bakers, and Google Trends. ComScore is a market researcher that follows almost 150 thousand internet users in Brazil in order to monitor audience behavior on websites as well as media investment. Social Bakers is a global monitoring company that collects data on social media for numerous industries. Google Trends is a tool to monitor trends for terms searched on Google. As Google does not provide absolute numbers about the searches in its engine, it is necessary to compare them with the companies to find out which one is the most recognized brand for users of Google searches. We selected metrics that we could compare across all institutions to calculate the players' performance ratios (1).

Regarding paid media, two variables that were included in the model came from ComScore: V1 - Media investment (the amount of investment in online media); V2 - Media impressions (the number of times that bank adverts appear for internet users).

We considered four variables (V3 to V6) for owned channels because of the complexity of this kind of media. The variables represent owned presence on websites and social media. The reports from ComScore's audience offered 22 metrics about website audiences, but we selected two representative metrics so as not to overestimate the role of the sites' audiences in the model: V3 - Average visits per month (total of visits/sessions on a website in a month); V4 - Average visits per visitor (the number of visits by a single visitor).

We did not find any metrics about mobile application use in Brazil; however, executives consider it important to measure user behavior on mobile applications.

Owned presence in social media was represented by the number of followers on Twitter and the number of fans on a Facebook page, both measured by Social Bakers. We selected these two social network sites because of their audience size in the Brazilian market: V5 - Facebook likes (the number of likes for a company's page); V6 - Twitter followers (the number of followers of a company's Twitter account)

Marketing executives cited the importance of the volume of buzz and the feelings expressed in posts; however, we did not include these variables due to the difficulty in monitoring them. Interviews with social media researchers indicated that reliable monitoring of posts encompasses the buying of an enormous volume of data and a taskforce to classify the posts by feeling. Considering the volume of posts for the banking industry—almost 1 million per month—this type of monitoring was not possible due to the scope of this study. We did, however, include a variable on searches in Google to indicate brand recall (KAUSHIK, 2012): V7 - Searches in Google (the number of brand searches performed in Google by internet users).

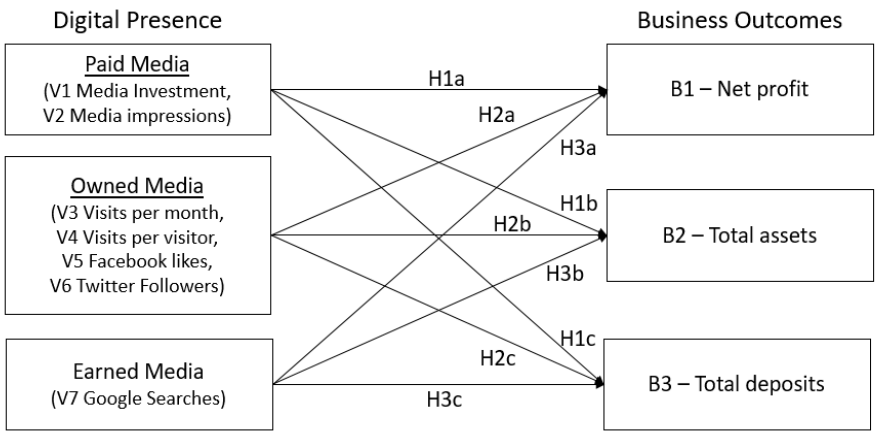
This variable may also be a proxy for buzz because it can capture social phenomena with precision. For example, it is used to detect regional outbreaks of influenza 7–10 days before conventional centers for disease control and Preventive surveillance systems (CARNEIRO; MYLONAKIS, 2009). When a topic is broadly mentioned on social media, the same trend is noted on Google.

We tracked these seven variables for nine months from January 2014 to September 2014. Although we have data from the whole year, the Brazilian Central Bank only provided

data until the quarter closed on September 2014. Table 1 shows the way the data was collected and consolidated, with each variable having a specific periodicity, point of measure, and aggregation. For example, the number of visits was collected monthly, counting nine points of measure from January 15 to September 15, the average of these points is variable 3 (average number of visits per month). The Brazilian Central Bank shows the results of the 50 largest Brazilian banks. From the original list, we excluded the banks that had no digital presence data or those that had insufficient data in the nine months studied. The final list contained 12 banks.

We verified the Digital Presence construct testing the hypotheses of the Paid Media (V1 and V2), Owned Media (V3, V4, V5, V6) and Earned Media (V7) groups affecting each dependent variable, B1, B2 and B3 (Figure 3). We also tested the independent variables ungrouped to verify whether other combination fit better the multivariate analysis.

**Figure 3. The Grouped Digital Presence Model**




## 5. Results

### 5.1. Hypotheses test

The statistics were calculated with the IBM SPSS software and for the conclusions it was considered 0,05 of significance in the inferential tests. The hypothesis (H1) that the Paid Media affected the financial results was not confirmed (Table 2). The group Paid Media (V1, V2) does not fit the model. Although, the independent variables V1 and V2 have moderate correlations with business outcomes individually. We believe the explanation for this problem is a linear relation between V1 and V2. Because the number of impressions is the amount of investment divided by the cost per impressions of each media vehicle.

The hypotheses of the Owned Media (H2) and Earned Media (H3) affect the financial results were confirmed and it is concluded that there is at least one beta, coefficient of the multiple linear regression model) different from zero, which means that there is a linear relation of the dependent variable (B1, B2, B3) with at least one independent variable (V2, V3, V4, V5, V6 and V7). The Owned Media has strong correlations with business results

meaning this media should be increasing the customer loyalty based on a good user experience.

We also verified the hypotheses of ungrouped independent variables affects positively the business variables. Although the test was confirmed for B1, they are confirmed for B2 and B3 because the significance in the inferential tests is above 0,05.

The grouping of the digital presence variables Owned and Earned is statistically significant and therefore can be used in the model to measure digital presence. The grouping of Paid Media variables was not confirmed, although V1 – Digital Media Impressions has an average correlation of 0,54 with business outcomes. For this reason, we will use the R of this individual variable rather than the group correlation to calculate the Banks DPI.

**Table 2: Hypothesis test using grouped digital presence metrics and business outcomes**

| Dependent variable | Independent variables | R | R Square | Sig ANOVA | Hypothesis |
|---|---|---|---|---|---|
| B1 | V1, V2 | 0,755 | 0,57 | 0,079 | H1a – Not confirmed |
| | V3, V4, V5, V6 | 0,96 | 0,92 | 0,01 | H2a– Confirmed |
| | V 7 | 0,639 | 0,409 | 0,025 | H3a - Confirmed |
| B2 | V1, V2 | 0,532 | 0,283 | 0,368 | H1b – Not confirmed |
| | V3, V4, V5, V6 | 0,947 | 0,897 | 0,001 | H2b - Confirmed |
| | V 7 | 0,832 | 0,682 | 0,001 | H3b - Confirmed |
| B3 | V1, V2 | 0,395 | 0,157 | 0,601 | H1c - Not confirmed |
| | V3, V4, V5, V6 | 0,95 | 0,903 | 0,001 | H2c – Confirmed |
| | V 7 | 0,882 | 0,778 | 0,000 | H3c – Confirmed |

**Table 3: Hypothesis test using ungrouped digital presence metrics and business outcomes**

| Dependent variable | Independent variables | R | R Square | Sig ANOVA | Hypothesis |
|---|---|---|---|---|---|
| B1 | V1, V2, V3, V4, V5, V6 e V 7 | 1 | 1 | 0,029 | H10 - Confirmed |
| B2 | V1, V2, V3, V4, V5, V6 e V 7 | 0,998 | 0,996 | 0,134 | H11 – Not confirmed |
| B3 | V1, V2, V3, V4, V5, V6 e V 7 | 0,999 | 0,998 | 0,084 | H12 – Not confirmed |

## 5.2 The digital presence index (DPI)

To produce a consolidated KPI (PETERSON, 2006) of the digital metrics of the Brazilian Banks, we created an equation to calculate the DPI. This equation combines the performance of a bank in each variable (Pnx) with the impact of the variable (Wn). We calculated a bank performance for each variable using Equation 1. The impact of the variables is the average of the correlations of between the group variable and the three business-results variables. The weight of P3, P4, P5 and P6 is the average correlation with business variables divided by 4, because there are 4 variables to represent Owned Media. We considered only the individual correlation of V1 – Media Investment and the dependent variables for Paid Media. The weights are balanced so that the DPI result varies from 0 to 10

(Equation 2). We learned from the executives that an index from 0 to 10 is easier to communicate, perhaps because of its similarity to a Brazilian school grade. As another advantage, by maintaining the index within a range, it is easier to compare the present result with a time series.

The DPI establishes the ranking of the digital presence of banks with grades from 0 to 10. Each grade is detailed in the seven variables that measure digital presence (Graph 1). Itaú has the highest digital presence followed closely by Caixa, Bradesco, Banco do Brasil, and Santander comprise an intermediary set. The other banks had DPI's lower than 1. This classification illustrates a competitive digital scenario concentrated in 5 Brazilian banks. The DPI can be updated every month as some variables have a monthly consolidation (Table 1). The executives can see the ranking of their company on Digital Presence and compare the performance of its company with the competitors for each digital variable (Table 2).

**Equation 1**

$$\mathrm{Pnx} = \frac{\mathrm{Vnx}}{(\mathrm{Max}\ (\mathrm{Vn}) - \mathrm{Min}\ (\mathrm{Vn}))} \quad (1)$$

Pnx: Performance of variable n for bank x
Vnx: Value of variable n for bank x
Vn: Variable n

**Equation 2**

$$\mathrm{DPIx} = \frac{(\sum_{i=1}^{n} Pnx \times Wn) \times 10}{(\sum_{i=1}^{n} Wn)} \quad (2)$$

DPIx: Digital Presence Index of bank x
Wn: Average correlation of the group variable with B1, B2, and B3

**Graph 1. The DPI ranking of Brazilian banks (PRODUCED BY THE AUTHORS)**

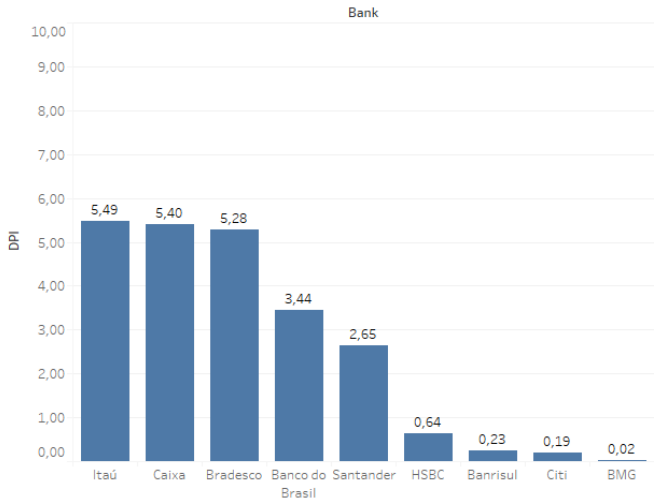



**Table 4: Comparison of performance of each digital presence in the Banking Industry (PRODUCED BY THE AUTHORS)**

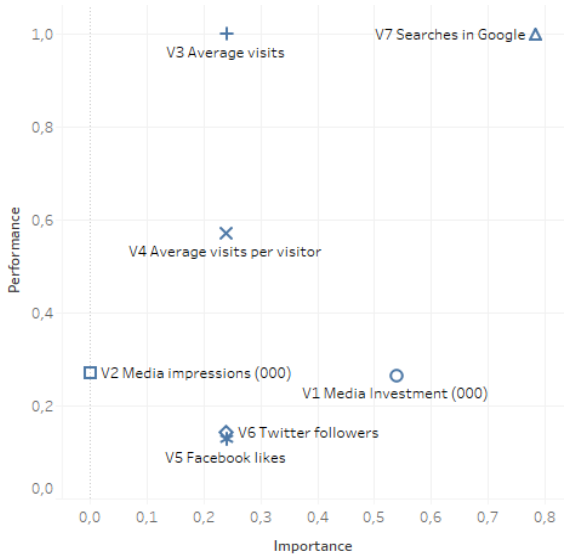
| Bank | DPI | P1 - Media Investment | P2 - Media impressions | P3 - Average visits per month | P4 - Visits per visitor | P5 - Facebook likes | P6 - Twitter followers | P7 - Searches in Google |
|---|---|---|---|---|---|---|---|---|
| Itaú | 5,49 | 0,361 | 0,366 | 0,999 | 0,785 | 1,000 | 1,000 | 0,433 |
| Caixa | 5,40 | 0,265 | 0,270 | 1,000 | 0,571 | 0,127 | 0,142 | 1,000 |
| Bradesco | 5,28 | 1,000 | 1,000 | 0,595 | 0,664 | 0,686 | 0,220 | 0,388 |
| Banco do Brasil | 3,44 | 0,219 | 0,143 | 0,724 | 0,909 | 0,237 | 0,256 | 0,478 |
| Santander | 2,65 | 0,451 | 0,087 | 0,409 | 0,633 | 0,187 | 0,323 | 0,179 |
| HSBC | 0,64 | 0,003 | 0,003 | 0,095 | 0,395 | 0,140 | 0,024 | 0,104 |
| Banrisul | 0,23 | | | 0,054 | 1,000 | 0,003 | 0,018 | 0,045 |
| Citi | 0,19 | 0,011 | 0,002 | 0,021 | 0,243 | 0,089 | 0,000 | 0,015 |
| BMG | 0,02 | | | 0,006 | 0,703 | 0,004 | 0,012 | 0,000 |
| Weight | | 0,539 | 0,000 | 0,238 | 0,238 | 0,238 | 0,238 | 0,784 |

## 5.3. The importance–performance matrix

To produce a clear picture of the contributions of digital presence to competitive advantage, we took the classic reference of the importance–performance matrix used in relevant fields such as marketing (MARTILLA; JAMES, 1977) and operations management (SLACK, 1994). The matrix explores the DPI ranking of each bank, presenting performance and the importance of each variable based on a comparative evaluation.

To illustrate the application of the matrix, we used the example of Caixa Econômica Federal, a government bank that is simply referred to as Caixa (Graph 2). The matrix visualization indicates the priority of actions to improve the digital presence. The V1 Media Investment is plotted on the urgent area because it is important to business outcomes and Caixa is performing under competitors. V2 – Media Impressions, V5 – Facebook likes and Twitter followers also need improvement. Caixa could create a campaign in Social Media to foster these variables. V4 and V7 are on the appropriate zone needing no corrective actions. V3 – Average visits is on the excess zone, the executives can decrease investments on actions to increase audience, because Caixa is outperforming competitors and this variable has less impact on business results. As we can see, the matrix can be used as a practical tool to help executives when making the decision to improve digital presence.

**Graph 2. The importance–performance matrix (PRODUCED BY THE AUTHORS)**




## 6. Conclusion

The study verified the feasibility to develop an index to measure the digital presence of companies. The DPI was calculated to the Brazilian banks industry based on two factors: (i) the correlations of digital metrics with business results (Table 2); (ii) the performance of the digital metric of each company compared to the other players.

The high correlations observed were expected due to previous studies (HARRISON, 2013; JÄRVINEN; TÖLLMEN; KARJALUOTO, 2012; KAUSHIK, 2009; KAUSHIK, 2012; KIMURA et al., 2016; MOE; SCHWEIDEL, 2017; PAUWELS et al., 2012; PETERSON, 2006; PHIPPEN et al., 2004; VAKRATSAS; AMBLER 1999; WESTERMAN et al., 2012; WILSON, 2010; YANAZE et al., 2010). The impact of digital presence on business results is especially notable in banking because of the digital maturity of this market (WESTERMAN et al., 2012).

However, these results must be observed with caution because only one industry with 12 companies was analyzed and the historical series is limited to one year. We intend to develop further studies, including other industries to reach more consistent results. This also would preferably involve large, medium, and small companies to observe the importance of digital variables for different sizes of business. The data collection must be broadened to include buzz monitoring and other social media sites like Youtube and Instagram.

This study contributed to expand the literature of multivariate analyses and data visualization to strategical decision making applied to DA. Because it consolidates the diversity of variables in a unified index. The DPI intends to overcome some challenges related on DA literature (ARUN et al. 2006; BUGHIN et al., 2008; KAUSHIK, 2007; SHANKAR; YADAV, 2010; STERNE, 2010) Furthermore, the DPI shows the performance of each variable comparatively to competitors, and the importance–performance matrix (Graph 3) seizing the opportunity of Big Data and DA metrics to provide competitive advantage to companies (DATSKOVSKY, 2013; MCGUIRE et al., 2012).

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