Influence of the Information Quality on the Organizational Performance in Algerian SMEs: Empirical Evidence

Soraya Sedkaoui
University of Khemis Miliana - Algeria
s.sedkaoui@univ-dbkm.dz

Rafika Benaichouba *
University of Khemis Miliana - Algeria
r.benaichouba@univ-dbkm.dz

Received: 18/09/2021 Accepted: 30/12/2021 Published: 31/12/2021

Résumé:

L'objectif principal de cette étude est d'analyser le rôle des compétences analytiques et du soutien managérial dans la génération de la performance organisationnelle, où la qualité de l'information pour la prise de décision est le facteur critique. Pour cela, un questionnaire d'enquête a été appliqué à un échantillon de convenance de 33 PME technologiques à Alger. Les données ont été analysées à l'aide de SPSS 28 en adoptant une analyse factorielle explicative. Les résultats contribuent à élargir les connaissances sur l'articulation des facteurs de succès d'une stratégie d'analyse de données et son effet sur la performance organisationnelle. Il est validé que les compétences analytiques affectent la qualité de l'information, affectant la performance organisationnelle. Par conséquent, l'interaction entre la qualité de l'information et les compétences analytiques des employés affecte le développement de la performance de l'organisation.

Mots clés: Qualité des informations ; la performance organisationnelle; compétences analytiques; soutien managérial; PME algériennes.

Codes de classification Jel: L25, L15, D81, C52.

Abstract:

The main objective of this study is to analyze the role of analytical skills and managerial support in the generation of organizational performance, where the quality of the information for decision-making is the critical factor. For this, a survey questionnaire was applied to a convenience sample of 33 technological SMEs in Algiers. The data was analyzed using SPSS 28 by adopting an explanatory factor analysis. The results contribute to broadening the knowledge about articulating the success factors of a data analytics strategy and its effect on organizational performance. It is validated that analytical skills affect the quality of the information, affecting organizational performance. Therefore, the interaction between the quality of information and employees' analytical skills affects the development of the organization's performance.

Keywords: Information quality; organizational performance; analytical skills; managerial support; Algerian SMEs.

Jel Classification Codes: L25, L15, D81, C52.

* Corresponding author.

1. Introduction :

Data analytics has become a strategic element of Information Technology (IT) for organizations (Sedkaoui, 2008). It facilitates decision-making based on traditional relational data, increases with new unstructured data sources; and allows companies to improve their data analysis competence, be more informed, and generate faster ideas. As more companies apply big data, they can improve the quality of information and their organizational performance (Sedkaoui, 2008).

Although there is evidence that data analysis can help organizations improve their organizational performance (Davenport & Bean, 2018) (McKinsey and Company, 2011), recent studies found that the vast majority of companies fail to take advantage of their investments in data strategy.

Data analytics is a holistic process that acts from data, mixing different resources to create ideas that generate value for the consumer and the organization. It describes the particularity of a set of factors that can generate extensive and intensive knowledge. In this context, big data has become a common path to competitive advantage for many companies in the digital economy.

Many authors establish that as data analytics evolves towards an information ecosystem, "quality" becomes a key construct to explain the impact of analytics in organizational performance.

In the same area, the quality of the information is defined as "the measurement of IT data outputs in terms of being accurate, timely, complete, reliable, relevant and precise" (DeLone & McLean, 1992). However, the most widely used definition is given by the American Society for Quality, which is based on customer satisfaction, in which it can be achieved not only by meeting the requirements but also by inherent characteristics of the product or service and how it is presented to users.

The data and information produced and used to plan, analyze, manage, direct and control business operations have long been considered necessary. According to Krishnan et al. (2005), the lack of formal, conceptual definitions and decision rules makes it difficult to develop practical systems for evaluating data reliability.

In this context, this study explores the role played by a series of antecedents of data analytics in the generation of organizational performance, where the quality of information for decision-making is the fundamental antecedent.

The main objective of this study is to explain the role played by qualified human resources and the managerial supports to improve the quality of information and help in the orientation of decision-making, based on a conceptual model. Therefore, the research question that the present work aims to answer is:

How does the quality of the data influence organizational performance, and how can skills and managerial support help it be strategically managed?

The paper is organized as follows: the process used began with the review of state of the art in terms of information quality and organizational performance (section 2). The research methodology and the characteristics of the sample were detailed in section 3 to support the relationships proposed as hypotheses. Section 4 details and discuss the main results of the empirical analysis and explore the determinants of information quality through the influence of analytical skills and managerial support and its effect on organizational performance. Section 5 ends with the conclusions and the main contributions, and the limitations are specified.

2. Literature review and research hypotheses:

Considering the previous claims, the academic literature on data analytics has responded with a series of researches that address the need to understand the articulation of information-generating factors for decision-making and organizational performance. The vast majority of research has studied the capacity of data analytics as a determinant of organizational performance. This brings a series of tangible, intangible, and human factors to form big data analytics capacity .

However, some authors establish that as data analytics evolves towards an information ecosystem, the dimensions of "quality" are as critical as the magnitudes of "capacity" to generate new knowledge for companies.

The concept of the quality of the information is a current issue that no organization can neglect or ignore because, in modern times, its dependence is vital since it has been defined as that information suitable for use, without universal acceptance. The quality of information is critical for organizations .

Despite decades of research and practice, the field lacks comprehensive methods for its evaluation and improvement without a systematic proposal. Therefore, the need for a methodology that assesses how organizations develop their information products is essential, as managers continue to complain that IT has not increased the quality of the information provided .

For organizations in public or private sector in a competitive environment, the quality of information is a way to survive and generate competitive advantage, considering that work is positively related to managerial satisfaction and organizational impact .

In the context of data analysis for decision-making, three critical concepts allow identifying and understanding the role that different organizational backgrounds play on organizational performance and their role within a data strategy.

2.1. Human resource Capacity:

Employees' skills determine the capacity for human analysis because data alone cannot generate insights. Skill is needed to exploit data (Zeng & Glaister, 2017). Data analysts are a key factor in obtaining value because people and their skills generate strategic benefits such as knowledge and capabilities. Additionally, there is a need for analytical skills and business sense, experience with data and tools, and communication and visualization skills that can deliver powerful messages. Consequently, we propose the following:

- **H1:** Skills have a positive relationship with the quality of information

2.2 Managerial Support:

Through skills, managerial support plays a leadership role through information alignment. The efforts to achieve local goals can be aligned with the overall success factors of organizations. When all employees understand the high-level goals and indicators, they can set local goals that support the overall strategies of their business units. Alignment involves the design of indicators, goals, and actions by managers to help achieve the business and corporate strategy objectives .

According to Davenport and Harris (2017), if the analyses support competitive strategies, they must have sufficient administrative support. Managerial support refers to the degree to which a manager supports IT practices. According to Berman et al. (2020), Managers increasingly realize that they have entered an era in which the full potential of data can be harnessed, turning it into information and generating contextualized knowledge and predictive .

Therefore, they play a fundamental role in generating information from their corporate IT strategie (Sedkaoui, 2008). These arguments lead us to propose intermediary relationships as follow*:*

-H2: Managerial support for data analytics has a positive effect on the quality of information.

2.3 Third subtitle:

Business users select the quality of the most relevant information for decision-making, which triggers actions that generate a wide range of insights and business value. The quality of the information allows companies to understand the essential needs of the market and, therefore, increase the value for the consumer (Wang, White, & Chen, 2015).

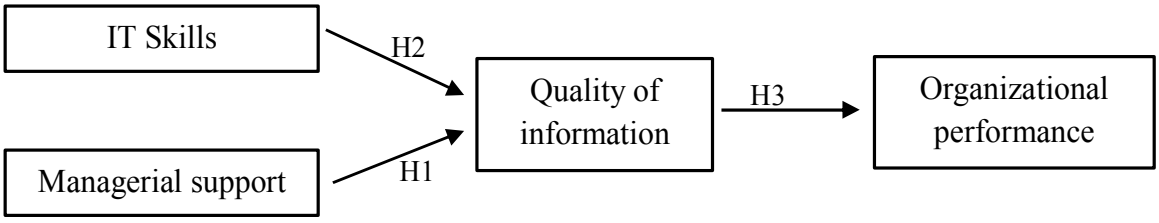
According to McKinsey and Company (2011), the information generated by big data benefits economies and creates new waves of productive growth. The previous literature shows that analyzing data that generates knowledge positively affects companies' financial results (Davenport and Harris, 2017; McAfee and Brynjolfsson, 2012). Consequently, we propose*:*

-H3: The quality of the information has a positive effect on organizational performance.

Therefore, in data analytics, analytical talent, managerial support, and type of analytics (traditional or advanced) present a platform of resources capable of generating quality information translated into organizational performance .

According to the identified factors and the previous literature, we derive the following conceptual model: And so on until the last title of the article.

Fig N° 1: Conceptual model



Source: Authors elaboration

Following the conceptual model, we propose that top management and data analysts (skills) play moderating roles.

3. Methodology:

After defining the research hypotheses, a questionnaire was designed to analyze the influence of the quality of the information. To measure the constructs proposed in the conceptual model, we include items from previous academic literature, including analytical skills, information quality, managerial support, and organizational performance. We adopted a five-point Likert scale (from 1 = "totally disagree" to 5 = "totally agree").

We performed a descriptive and factor analysis in SPSS version 28. The paper uses Pearson's correlation analysis, Keyser-Meyer-Olkin (KMO), and Bartlett's tests. Then, explanatory factor analysis was carried out to estimate the measurement and the structural model. The research hypotheses are tested using Structural Equation Modeling (SEM), which identifies the effect of analytical skills and managerial support on the quality of information and the impact on organizational performance.

After being validated by academics and experts, the next step consisted of conducting a pilot study, which helped establish the validity of the items and the content; in other words, the application of the instrument's pretest to improve it, requesting feedback on possible errors. The main contribution has been raised in the sense of eliminating items that were not sufficiently reliable. The result determined items for the variables: Skills, quality of the information, managerial support, and organizational performance.

Table 1 details the results of the validity and reliability analysis based on alpha Cronbach values.

Table N°1: Results of Reliability analysis

Variables	Items	Mean	St Dev	Cronbach
IT skills	**Skill_1:** Employees are very capable of managing a technological project	3.76	.792	.830
	Skill_2: Employees are competent in the areas of management, data maintenance, and networks	3.52	1.004	.814
	Skill_3: Employees show a superior understanding of technology trends	3.12	.857	.823
	Skill_4: Employees show a superior ability to learn new technologies	3.48	.795	.832
	Skill_5: Employees know well the critical factors for organizational success	3.30	.810	.828
Quality of data	**Quality_1:** Data provide all the necessary information	2.61	.933	.797
	Quality_2: Provide the latest and real-time information	3.21	.857	.815
	Quality_3: Data contain suitable formats	3.39	1.059	.844
	Quality_4: Data are easy to understand	3.33	.924	.810
Organizational performance	**PERF_1:** Data analytics improved clients loyalty	3.45	.833	.783
	PERF_2: Data analytics improved sales growth	3.42	.792	.787
	PERF_3: Using analytics improved profitability	3.64	.994	.838
Managerial support	**Man_Sup_1:** Managers are passionate about data-driven decision making and analysis	3.70	.883	.820
	Man_Sup_2: Managers declare that our organization is an analytical competitor	3.27	.977	.778
	Man_Sup_3: Managers declare that our strategy is based on analytical information	3.70	1.132	.787

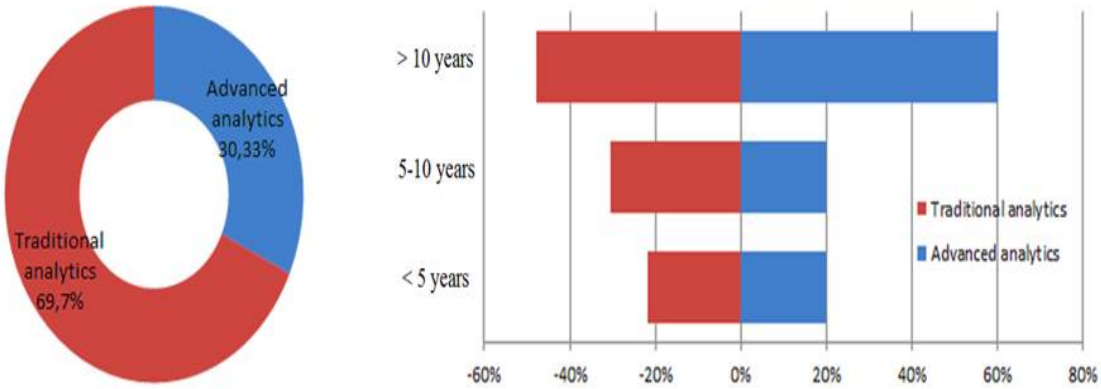
Source: Authors elaboration based on SPSS outputs

Likewise, it must be clarified that the minimum value accepted for the reliability of the items was Cronbach's Alpha equal to or greater than 0.6 (Hair, Black, Babin, & Anderson, 2014). Since Cronbach's alpha values exceed 0.7, the results indicate a satisfactory level of reliability.

The questionnaires contained common elements to evaluate factors that reflect a perspective of information quality, the related human resources qualification, and the managerial support, aligning with organizational performance. For this, 50 questionnaires were sent to different technological SMEs located in Algiers, and 38 agreed to participate in the survey (76%), but 33 questionnaires were conforming to be analyzed.

The companies participating in the study are kept anonymous since this was agreed with their managers or owners. All respondents stated that data analysis was a critical competitive advantage, but less than 31% use advanced analytics, while 69.7% still use the traditional analytics tools and methods, as shown in figure 2.

Fig N° 2: SMEs age according to the type of analytics used



Source: Authors elaboration based on collected data

Regarding the age of the SMEs, most of them carry out their business activities for more than ten years, and 70% of them use advanced analytics tools. According to Davenport (2014), there are sectors with a lot of consumer information. However, in the case of this paper, traditional analytics continues to have supremacy over advanced analytics; even if the technical nature of this sector needs more adaptation to new analytics methods and tools, this shows the studied SMEs are still late in this domain.

4. Results and Discussions:

Once the characteristics of the participating SMEs regarding the use of analytics had been determined, the next step consisted of performing the correlation analysis to identify a significant association between the study variables. Table 2 shows the results of the correlation analysis.

Table N°2: Correlation matrix

	Skills	Quality	PERF	Man_Sup
Skills	1.000			
Quality	**.617**	1.000		
PERF	.343	**.587**	1.000	
Man_Sup	**.612**	.163	.314	1.000

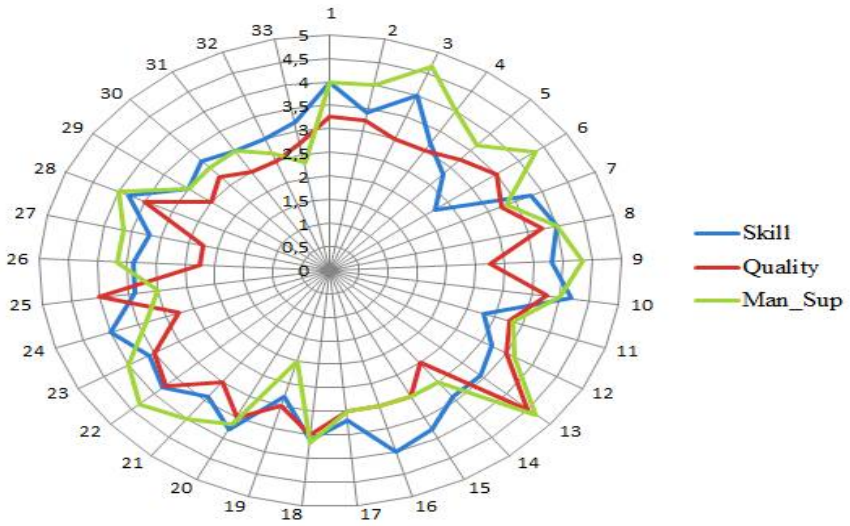
Source: Authors elaboration based on SPSS outputs

The results conclude that there is a positive and significant correlation between the quality of information and organizational performance, according to the value of Pearson coefficient obtained, which turns out to be positive and with bilateral significance (>0.5). It can be indicated that the correlation value (0.587) affirms a strong relationship between these variables.

The correlation results shown in Table 2 indicate that the quality of information is positively correlated with qualified employees (0.617), which is correlated to the support of managers (0.612).

This is confirmed in Figure 3, which states that analytical skills are a crucial element in the interpretation and exploration of data and that their work is closely related to business managers in generating ideas that lead to more strategic decisions. These elements and their connection have improved and developed the data analytics process in the studied enterprise.

Fig N° 3: Quality information and the support of Managers and employees skills



Source: Authors elaboration based on collected data

So, the quality of the information designed for strategic decision-making relies more on analysts' skills and managerial support regarding data analytics.

The correlations results also indicate an average correlation between organizational performance and analytical skills (0.343), which is correlated to the support of managers (0.314).

To analyze the hypotheses, explanatory factor analysis is used the results in Table 3.

Bartlett's test of sphericity confirmed the relationships between the variables ($p < 0.001$). In addition, the Kaiser-Meyer-Olkin (KMO) measures indicated values greater than 0.7, which is considered good.

Table N°3: KMO and Bartlett test results

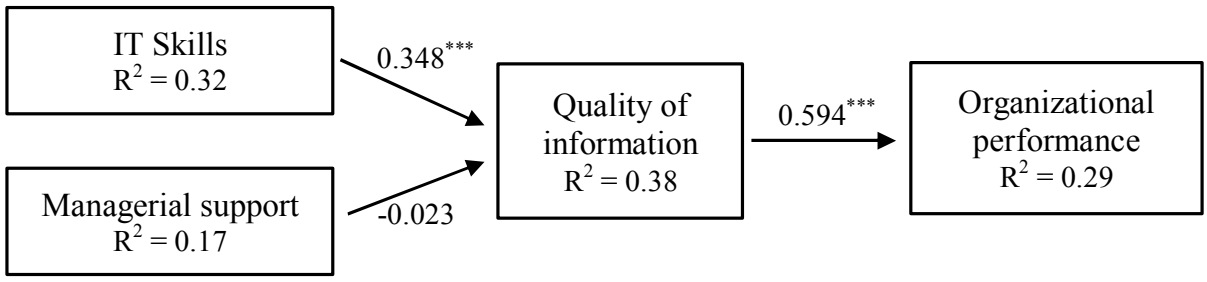
Kaiser-Meyer-Olkin (KMO)		**.795**
Bartlett sphericity test	Khi-scare approx	188.211
	Dl	105
	Signification	< .0001

Source: Authors elaboration based on SPSS outputs

Hierarchical analysis was performed concerning the research hypotheses tests by introducing the variables hierarchically into the regression to test the main model. The model first introduces the information's quality, then jointly introducing the employee's analytical skills and managerial support.

Figure 4 shows the estimated structural model, R^2, and the coefficients β

Fig N° 4: Estimated model (*p < 0.001)**



Source: Authors elaboration based on SPSS outputs

R^2 indicates the variance explained by the variable within the model. According to Falk and Miller (1992), R^2 should be equal to or greater than 0.1. Because lower values, although significant, provide little information. The R^2 values for the variables are the following: organizational performance (0.29), information quality (0.38), managerial support (0.17), and analytical skills (0.32).

This means that analytical skills explain 32% of the variation of the alignment of the data strategy. In addition, employee capacity has a more substantial influence on the quality of information than managerial support by generating higher quality insights. This result means that SMEs can constantly improve their analytical skills to enhance information quality, improving organizational performance, and becoming leaders in the analytics competition.

Empirical evidence confirms a positive effect of information quality on organizational performance. Furthermore, all the R^2 values are more significant than the threshold of 0.1, so the model has good predictive power. In addition, the value of the comparative fit index (CFI) 0.943 (greater than 0.85) and Root Mean Square Error of Approximation (RMSEA) 0.021 (less than 0.08) show that the model is acceptable.

The following indicates that two established relationships in the adjusted model are statistically significant (p <0.001), concluding that, in general, for this study, the model presents reasonable adjustment values that would allow validating the first and the third research hypotheses.

Table N°4: Hierarchical regression analysis without moderation

Correlation	Estimator	SE	P-value
Quality of information ← IT Skills	0.348	0.081	***
Quality of information ← Managerial Support	-0.023	0.075	0.723
Organizational performance ← Quality of information	0.594	0.087	***

Source: Authors elaboration based on SPSS outputs

The results do not confirm the second hypothesis (H2), which supposes a positive relationship between managerial support and information quality. Furthermore, this study reveals that analytical skills are decisive regarding the quality of the information, achieving a statistically significant positive effect between the variables, supporting the first hypothesis (H1).

Therefore, the quality of the information in the studied SMEs is measured by the analytical qualification of the employees. Because analytical skills present a key factor in obtaining quality information, having data analysis experts is vital. This result empirically validates Davenport's (2014) claim that the skills of talented human beings are the most important resource for exploiting the hidden truths of big data.

These results show also that the quality of information affects organizational performance, achieving a statistically significant positive effect between both variables, and support the third hypothesis (H3). This result empirically supports the relationship between the quality of information and organizational performance and is in line with the results of FossoWamba et al. (2017) and Gupta and George (2016).

Previous literature identifies the quality of information as a key factor for organizational success (Fosso-Wamba, Gunasekaran, Akter, Ren, Dubey, & Childe, 2017). Our research confirms that the quality of information is a precedent for organizational performance. Therefore, Algerian SMEs must support initiatives that promote information quality indicators and ensure optimal availability of resources and associated analytical processes.

By aligning their data strategy with business strategies, Algerian SMEs will be better equipped to meet customer needs, increase sales and revenue, create new products and services, and expand into new markets, all thanks to the quality of information (Sedkaoui, 2008).

The study results offer new perspectives for SMEs in the ICT sector and show that the successful implementation of data analysis is incipient. The failure of a data project may be the result of inexperience or immaturity in the sector. Big data promote innovation that can provide a competitive advantage to organizations (Sedkaoui, 2008).

Data analysis involves extracting essential information about consumer behavior and exploiting that insight through advantageous interpretation (Erevelles, Fukawa, & Swayne, 2016). Consequently, this study indicates that the use of advanced data analytics favors organizations.

5. Conclusion:

It has been shown that the empirical study shows how organizational performance is influenced in the studied SMEs through a set of scientifically articulated antecedents, where the quality of information is the fundamental antecedent for decision-making strategies. In this context, the data strategy, which includes indicators, goals, objectives, and initiatives aligned with the corporate strategy, has a crucial role.

In this study, to generate a positive effect on organizational performance from a data analysis project, the quality of the information is a key factor. It is also formulated that data strategy and analytical skills affect information quality, influencing organizational performance. All these elements allow establishing the ideal relation on the data analysis's antecedents that explain the organizational performance.

Also, analytical skills are essential to organizational performance (Davenport & Harris, 2005). This study confirms that this element is an antecedent variable of the quality of information for strategic decision-making. Consequently, Algerian SMEs must make an effort to capture, retain, and train data analytics skills to ensure sufficient key resources to achieve predefined information quality objectives. However, how analysts organize themselves is also essential.

This study has limitations that can be addressed in future research, mainly:

- ✓ The variables we consider reflect the perceptions of business management and are therefore subjective.
- ✓ The definition of data analytics is relative because there is no consensus on the definition of the term or its characteristics.
- ✓ The small size of the sample and lack of consensus could have generated diverse management impressions about whether their enterprise uses advanced analytics.

Future researchers could address these limitations and incorporate other critical success factors that we did not consider in this study.

6. List of references:

1. Berman, S., Marshall, A., and Ikeda, K. (2020). How leading CEOs drive a differentiating advantage through AI, data analytics, and insight. Strategy and Leadership, 48(3), 39–50.
2. Davenport, Thomas, and Bean, R. (2018). Big Companies Are Embracing Analytics, But Most Still Don't Have a Data-Driven Culture. Harvard Business Review, 6. Retrieved from https://hbr.org/2018/02/big-companies-are-embracing-analytics-but-most-still-dont-havea-data-driven-culture
3. Davenport, T., and Harris, J. (2017). Competing on Analytics: The New Science of Winning (1st ed.). Boston: Harvard Business School Press.
4. Davenport, T. (2014). How strategists use big data to support internal business decisions, discovery, and production. Strategy and Leadership, 42(4), 45–50.
5. Davenport, T., and Harris, J. G. (2005). Automated Decision Making Comes of Age. MIT Sloan Management Review, 46(4), 83–89. Retrieved from http://sloanreview.mit.edu/article/automated-decision-making-comes-of-age/
6. DeLone, W. H., and McLean, E. R. (1992). Information systems success: The quest for the dependent variable. Information Systems Research, 3(1), 60–95.
7. Erevelles, S., Fukawa, N., and Swayne, L. (2016). Big Data consumer analytics and the transformation of marketing. Journal of Business Research, 69(2), 897–904.
8. Falk, R., and Miller, N. B. (1992). A Primer for Soft Modeling. Open Journal of Business and Management, 2 (103). Retrieved from http://books.google.com/books/about/A_Primer_for_Soft_Modeling.html?id=3CFrQgAACAJ
9. Fosso-Wamba, S., Gunasekaran, A., Akter, S., Ren, S. J. fan, Dubey, R., and Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. Journal of Business Research, 70, 356–365.
10. Gupta, M., and George, J. F. (2016). Toward the development of a big data analytics capability. Information and Management, 53(8), 1049–1064.
11. Hair, J.F., Black, W.C., Babin, B.J., and Anderson, R.E. (2014). Multivariate Data Analysis. 7th ed. Harlow, UK: Pearson Education.
12. Krishnan, R. J., Peters, R., and Kaplan, D. (2005). On Data Reliability Assessment in Accounting Information System. Information Systems Research, 16 (3): 307-326.
13. McAfee, A., and Brynjolfsson, E. (2012). Big Data : The Management. Harvard Business Review, 60–66. Retrieved from https://hbr.org/2012/10/big-data-the-managementrevolution
14. McKinsey and Company. (2011). Big data: The next frontier for innovation, competition, and productivity. In McKinsey Global Institute. https://doi.org/10.1080/01443610903114527
15. Sedkaoui, S. (2018). How data analytics is changing entrepreneurial opportunities?, International Journal of Innovation Science,10 (2), 274-294.
16. Wang, X., White, L., and Chen, X. (2015). Big data research for the knowledge economy : past, present, and future. Industrial Management and Data Systems, 115(9).
17. Zeng, J., and Glaister, K. W. (2017). Value creation from big data: Looking inside the black box. Strategic Organization, 1–36.