The Future of Business Analytics for SMEs in MENA Region

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Abstract: *Business Analytics (BA) has become an important source of competitive advantage for small - and medium – sized enterprises (SMEs) in the modern era of electronic commerce and commercial globalization. The application of BA is particularly widespread in the developed countries. However, in the developing world, such as the Middle East and North Africa (MENA) region, the uptake of BA is less impressive due to many factors including lack of finances. This study sought to establish the status of BA adoption among SMEs in the MENA region, the factors influencing their adoption, the role of business size in adoption decision, and the future of BA for SMEs in the MENA region. The study established that the size of a business plays a major role in BA adoption decisions due to size-related factors, such as ability to access finances and management structure. The study also established that while most of medium-sized enterprises in the MENA region have adopted BA tools, most of small-sized enterprises are yet to do so. Consequently, the future of BA for SMEs in this region is dependent on whether SMEs, particularly small-sized enterprises can obtain better access to credit. Government policies to enhance this access as well as to enhance awareness among the SMEs about the importance of BA will also play an essential role in determining the future of BA among SMEs in this region.*
Keywords: *Business Analytics, Data Analysis, SMEs, MENA*

I.   Introduction

Business analytics (BA) has become an important source of competitive advantage for businesses in the modern era of electronic commerce and commercial globalization. In most developed countries, business analytics have been part of business strategy for many years but, in most developing countries, the uptake of BA is still low. The uptake level of BA is even more woeful when considered in the context of small and medium-sized enterprises (SMEs) in developing countries, such as those in the Middle East and North Africa (MENA) region. An increasing number of SMEs in the MENA region are gradually adopting business solutions in the form of business analytics and business intelligence tools. However, the uptake of BA solutions by these SMEs is still slow and low due to a number of reasons including; limited financial resources (Ashrafi, Sharma, Al-Badi, & Al-Gharbi, 2014; Al-Gharbi & Ashrafi, 2010), lack of information and awareness about BA solutions, lack of crucial enabling resources (Shehadi, Bitar, & Khoury, 2010), oversight, lack of skilled employees (Al-Gharbi & Ashrafi, 2010), and perceptions that the benefits obtained from BA may not produce business value (Ashrafi et al., 2014). Some SMEs also consider BA as unnecessary for their enterprises (Goebel, Norman, & Karanasios, 2015) while, for others, the perceived complexity of BA is a source of fear (Symes, 2014). The public sector remains as the greatest source of employment in the MENA region (Zgheib, 2017). This, however, is not sustainable in the long term. Consequently, there is need to provide SMEs in this region with the necessary support, including access to credit and other forms of financing, access to markets, and access to business development services, such as information and communication technology (ICT), business analytics, and business intelligence. The creation and development of more SMES and provision of opportunities for greater access to credit by these SMEs can spur economic growth and job creation. However, entrepreneurial performance of economies, which refers to the rates of SMEs creation, survival, growth and exit is likely to produce the best picture of the role of SMEs as tools of wealth and job creation (OECD, 2013). Business analytics can play a crucial role in this form of dynamic approach. Despite the potential of BA in enhancing the economic performance of SMEs, the number of studies investigating BA adoption in the MENA region is limited. The main goal of this research is to bridge this gap by exploring the status of BA adoption by SMEs in MENA region, the factors influencing BA adoption by SMEs, and the future of BA for SMEs in MENA region.

II.   Background

What is Business Analytics?
Business analytics "refers to a broad use of various quantitative techniques such as statistics, data mining, database structure, optimization tools, and simulation supported by the query and reporting mechanism to assist decision makers in making more informed decisions within a closed-loop framework seeking

continuous process improvement through monitoring and learning" (Min, 2016, p. 1). Wang (2014) defines business analytics (BA) as "a set of skills, technologies, applications and practices built based on data and statistical methods" (p. 709). Das (2013) describes BA as "a process that transforms raw data into actionable knowledge to guide strategic decision-making" (p. xiii). BA is concerned with finding actionable knowledge and the formulation of "new business opportunities from such knowledge" (Lin, 2014, p. 4). It involves value and performance measurements and the identification of actionable knowledge and insight that would be valuable to the achievement of business strategies and objectives (Stubbs, 2013). Therefore, analytics in business is not merely about working with numbers but is about delivering sustained value for the business.

Role of SMEs in the Economy of MENA Region

MENA region is comprised of at least 15 countries including; Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Tunisia, Turkey, and the United Arab Emirates (Solati, 2017). Most of these are developing countries. Small and Medium-sized Enterprises (SMEs) in the MENA Region operate in a variety of fields including; manufacturing, service, trade, technology, and agri-business sectors. The classification of a business enterprise as an SME can vary depending on region. In this study, the term SME was assigned to business enterprises with between 50 and 250 employees. Those with 50 or less employees were classified as small-sized while those with over 50 employees were classified as medium-sized. SMEs have played a major role in the development of the countries in the MENA region by creating employment, preserving the environment, reducing poverty, and contributing to inclusive and sustainable growth of economy (Baporikar, 2014).

Going forward, acceleration of the creation and development of SMEs has been identified as one of the ways in which the MENA region can spur job-rich growth (OECD, 2013). According to Saleem (2010), the contribution of formal SMEs to employment in developing countries is estimated at 45% and their contribution to gross domestic product (GDP) is close to 33%. The contribution of informal SMEs further enhances these approximations underlining the importance of SMEs to the economy of developing countries. North Africa has a youth unemployment rate of 25.1% while that of the Middle East is approximately 23.7%, both of which are above the global average of 12.6% (Saleem, 2010). The rate of female entrepreneurship in the two regions is between 12 and 15 % against a global average of 31-38% (Saleem, 2010). Therefore, growth and competitiveness of SMEs in the MENA region can ease the current youth unemployment problem. The sustainability and competitiveness of these SMEs can be enhanced using business analytics. The benefits for SMEs from BA implementation are remarkable. The implementation hastens the analysis of data allowing a firm to realize deliverable solutions quickly (Goebel, Norman, & Karanasios, 2015). BA also allows firms to complement their in-house information with external information (Goebel, Norman, & Karanasios, 2015). BA can also enhance relations with customers and suppliers, which is likely to enhance the efficiency and effectiveness of the firm (Al Tawara & Gide, 2016). BA also helps firms to identify key success factors (KSFs) by pinpointing causal relationships, thus enabling firms to understand the factors that drive financial performance now and those that might drive it in the future (Tavana, 2014). Additionally, development in complementary technology, such as cloud computing, has created new potential for BA implementation that can reduce the business costs of an SME.

This paper is structured as follows. The introduction and background comprise section one; section two has the literature review; the research methodology is in section three; results and discussion are in section four; and section five contains the conclusion and recommendations.

III. Literature Review

The literature review looks at the level of BA adoption by SMEs in MENA region, the effect of business size on likelihood of BA adoption, the factors that influence BA adoption by firms in the MENA region, and the future of business analytics for SMEs in the MENA region.

BA Adoption by SMEs in MENA Region

SMEs have contributed greatly to employment creation and economic growth in the MENA region. At this point, not much information is available about the level of BA adoption by SMEs in the MENA region. However, the most common IT-related challenges experienced by SMEs include: less than optimal business processes; poor information management; poor implementation of information technology solutions and services; less than optimal IT planning and management; and poor risk and data management; less than optimal management of budget; and poor knowledge management (Doherty et al., 2013). Although BA solutions are only a small component of IT in an organization, the fact that SMEs experience many IT-related challenges implies that these enterprises have yet to adopt IT-related solutions, including business analytics.

Factors that Influence Adoption of BA

The size of a business enterprise plays an important role in the BA adoption decision. The decision on whether to adopt BA is also influenced by perceptions of the business value of BA. Some of the factors identified in previous research as being influential in the assessment of business value of BA adoptions in small and medium-sized enterprises include: organization and management practices, impetus for business analytics adoption, government support and organizational change value (Ashrafi, Sharma, Al-Badi, & Al-Gharbi, 2014). Another important factor influencing BA adoption is finances. SMEs usually lack the budget and talent required to implement BA (Gunasekaran, Rai, & Griffin, 2011). According to the International Monetary Fund (2014), the proportion of credit given to SMEs in the MENA Region by banks is small, which leaves a large number of SMEs devoid of access to such credit. A survey by the World Bank indicated that only 8% of total bank credit in 2010 or 6.7% of the Gross Domestic Product (GDP) was allocated to SMEs in MENA region (as cited in Gray & Karam, 2013). Conservative estimates indicate that approximately "32% of SMEs across the MENA region are totally excluded from access to finance" (Elasrag, 2016, p. 96). This limits the financial capabilities of many SMEs as well as their ability to invest in BA and business intelligence tools.

Future of Business Analytics

SMEs' contribution to employment and GDP in developing countries is approximately 45% and 33% respectively with these contributions increasing to around 62% and 64% respectively when SMEs within the informal sector are considered (International Monetary Fund, as cited in Saleem, 2010). These statistics show that SMEs can transform the economies of the countries in MENA region if afforded opportunities to excel. BA adoption is among the greatest opportunities available for SMEs to spur their growth. Among the challenges that SMEs can solve using BA include: sustaining customer loyalty; managing change and budget (McLaughlin, 2014), and managing human resource and talent (PWC, 2013). BA is also likely to assist firms in overcoming market barriers and forming new market opportunities (Doherty, Carcary, Downey, & McLaughlin, 2013). Unlike larger firms, SMEs, by virtue of being small and flexible, have a better capability of adapting to change (Goebel et al., 2015). Consequently, SMEs should be incentivized to embrace BA through easier credit access and government policies as well as government and industry incentives.

This study seeks to answer the following research questions:
- What is the current status of adoption of business analytics (BA) by SMEs in MENA Region?
- What effect does the size of an enterprise have on BA adoption?
- What are the factors that influence the adoption of BA by SMEs in MENA region?

What is the future of business analytics for SMEs in MENA region?

IV. RESEARCH METHODOLOGY

Based on information obtained from the literature review, a research instrument in the form of an online questionnaire was customized for this study to identify the usage, perceptions, and factors influencing the adoption of business analytic by SMEs in MENA region. The questionnaire considered 25 items, which were a variety of closed-ended and open-ended questions as well as a four-point likert scale with "1" implying 'unsatisfactory' and "4" implying 'exceeds expectations'. The questionnaire collected information on various issues including: type of organizational structure, types of business analytics used in the organization, contribution of BA in organizational operations, level of satisfaction with BA, and suggestions for improvement in BA adoption among SMEs among other issues. These details were obtained from 500 SMEs within the MENA region. The researcher targeted managers and owners in these SMEs as it is widely acknowledged that these classes of people have the best knowledge of the BA tools applied in their organizations. The questionnaire was created on Kwik Surveys and the link distributed via email and direct messages to pre-selected SMEs until 500 valid responses were received. The pre-selected SMEs were randomly selected from existing public databases of operational SMEs in the region. The managers or owners of those SMEs were contacted and consent for the survey sought from them before the link to the online questionnaire was sent to them via email. Since the questionnaire was self-administered, the respondents were notified that all their responses would be accepTable, and their identities would be treated confidentially. The MENA countries in this study's sample include; Saudi Arabia, Lebanon, Oman, Bahrain, Egypt, Jordan, Kuwait, Qatar, and the United Arab Emirates.

The valid responses from these countries were distributed as shown in Table 1.

Table 1: Country of The Respondents

Value	Frequency	%
Bahrain	79	15.80
Egypt	6	1.20
Jordan	10	2.00
Kuwait	23	4.60
Lebanon	25	5.00
Oman	59	11.80
Qatar	86	17.20
Saudi Arabia	137	27.40
UAE	63	12.60
N/A	12	2.40

A pilot study involving fifteen SMEs (5 in Jeddah, Saudi Arabia; 5 in Beirut, Lebanon; and 5 in Dubai, UAE) was carried out to test the questionnaire. The inconsistencies and ambiguities identified in the survey instrument during the pilot study were rectified before the questionnaire link for the main study was distributed. The questionnaire was also tested for reliability during the pilot study. A Cronbach Alpha test was conducted on five questions in the questionnaire namely; questions 17, 19, 20, 23, and 24. The results of the test are shown in Table 2.

Table 2: Reliability statistics

Cronbach's Alpha	Number of Items
.87	5

The test returned a Cronbach's alpha value of 0.87, which, on the basis of being greater than 0.6, should, according to Ray (2016), be taken to mean that the questionnaire is highly reliable or internally consistent. The obtained research data was analyzed via SPSS v.24 software.

V.   Data Analysis And Findings (Results)
This study sought to answer four questions that were identified earlier. This section discusses the findings of the research based on these questions. These questions are discussed individually based on a statistical analysis of the collected data.

Research Question 1: What is the current status of adoption of business analytics (BA) by SMEs in MENA Region?
Of the 500 valid responses, 29% were small enterprises and 71% were medium-sized enterprises, which was a good representation of each type of enterprise. 62.8% of the respondents were managers and the remaining 37.2% were owners as shown in Table 3.

Table 3: Who is in charge of management at your enterprise?

Value	Frequency	%
The Manager	314	62.80%
The Owner	186	37.20%

Most of the owners represented the small enterprises while a majority of the managers responded for the medium-sized enterprises. This shows that managers and owners play the greatest role in the process of decision making in SMEs.

Table 4: Decision type in organization

Value	Frequency	%
Structured	291	58.2%
Semi-structured	165	33.0%
Unstructured	44	8.80%

As shown in Table 4, 33% of the samples SMEs were semi-structured, 58.20% were structured, and 8.8% were unstructured. A majority (54.6%) of the respondents indicated that they did not train their employees on modern ways of obtaining and reporting information from customers on matters, such as product complaints, industry trends, and product needs. Most of the respondents (72.6%) reported that they used business analytics in their organization. The recognition of the importance of BA in enhancing efficiency was almost unanimous with 61.8% of the respondents indicating that the contribution of BA tools to cost cutting in the organization

was either 'fairly influential' (22%) or 'influential' (39.8%). 63.4% of respondents felt that the contribution of BA tools in the improvement of trust in an organization was 'fairly influential' (20.4%) or 'influential' (43%). Only 20.8% of respondents felt that business competitiveness since the adoption of business analytics met expectations with 56.8% feeling that improvement in the contribution of BA was needed.

The findings show that for many small-sized enterprises, lack of information and awareness about BA solutions and limited financial resources were the main impediments to BA adoption while most managers in medium-sized enterprises felt that lack of skilled employees and perceptions that BA is unnecessary were the main impediments.

Research Question 2: What effect does the size of an enterprise have on BA adoption?

As shown in Table 5, of the 500 valid responses, 29% were small enterprises and 71% were medium-sized enterprises.

Table 5: What is the number of employees in your organization?

Value	Frequency	%
10 – 50	145	29.00 %
50 – 250	355	71.00 %

Of the small-sized enterprises, 60.69% had not adopted BA tools compared to only 13.8 % of the responding medium-sized enterprises which had not adopted BA tools. Therefore, the size of an enterprise played a significant role in influencing the adoption of BA solutions with the larger firms more likely to adopt such solutions than the smaller ones. This finding can be linked to the fact that lack of sufficient financial resources has been identified as one of the impediments to adoption of BA by SMEs. Other common impediments to BA adoption, which are analyzed more comprehensively as part of research question 3, are also more prominent among small-sized enterprises than medium-sized enterprises. Another aspect of organization size identified in the research was the role of an organization's structure in determining the use of BA. Most small –sized enterprises in the research either had an unstructured or semi-structured organizational structure.

Table 6: Influence of organization structure on BA adoption

Decision type in organization	Does your organization use business analytics	
	No	Yes
Semi-structured	53.94%	46.06%
Structured	4.47%	95.53%
Unstructured	79.55%	20.45%

In general, as shown in Table 6, 53.94% of the organizations with semi-structured type of management reported that they did not use BA tools with an even larger %age (79.55%) of those with unstructured management indicating that they did not use BA tools. On the other hand, 95.53 % of the organizations whose management was structured reported that they used BA. Therefore, the type of management structure in an SME plays a crucial role in determining whether BA is adopted. The SMEs with more formal management structures are more likely to adopt BA tools in line with the more professional approach to their management than those organizations whose management is informal or unstructured.Most of the structured organizations (61.86%) also reported that they continually trained their employees on modern ways of obtaining and reporting information from customers compared to only 28.48% in semi-structured organizations and none in unstructured organizations.

The inability of many small-sized enterprises to afford the maintenance of a professional manager also plays a role in BA adoption. Most of Small-sized enterprises had no manager, but their management was under the owner. Most medium-sized enterprises, on the other hand, were under the management of a professional manager. A cross-tabulation of the type of management against BA adoption showed that 97.45% of the organizations under a professional manager had adopted BA compared to a paltry 30.65% of the organizations managed by their owners.

Research Question 3: What are the factors that influence the adoption of BA by SMEs in MENA region?

Most of the respondents (56 %) felt that their firm's investment in BA was insufficient. Lack of information and awareness about BA solutions was cited as the greatest impediment (44.6%) to adoption of BA tools by SMEs. 25.4 % felt that BA is unnecessary for SMEs while 12.4 % felt that lack of skilled employees was the greatest impediment to BA implementation. A significant number (17.6%) also cited limited financial resources as an impediment to the adoption of such solutions.

Research Question 4: What is the future of business analytics for SMEs in MENA region?

52.8 % of respondents felt that the contribution of BA tools in enhancing trust in an organization is either 'influential' (43 %) or 'very influential' (9.8 %). Additionally, 50 % of the respondents felt that BA tools

were either 'influential' (39.8 %) or 'very influential' (10.2 %) in reducing costs for the organization. From these two findings, it is safe to deduce that BA has a future in the business environment for SMEs in the MENA region. However, the factors identified in research question three will play an influential role in determining how this future builds up. The survey instrument requested opinions from the respondents on the best way to enhance the adoption of BA tools by SMEs in the region. The most popular answers by the respondents included: (i) easier access to credit by SMEs; (ii) increasing awareness about BA solutions among SMEs; and (iii) provision of training about how to implement BA tools.

VI. CONCLUSION

This study sought to answer four questions. The first involved exploration of the current status of adoption of business analytics (BA) by SMEs in MENA Region. The results from this study imply that many SMEs in the MENA region does not use BA tools. The main reasons for the low uptake of BA tools include: lack of sufficient resources, perceptions that BA is unnecessary for SMEs, lack of skilled employees, and lack of information/awareness about BA tools. The findings show that SMEs under the management of a manager are more likely to implement BA than those under the management of the owner. This implies that many owners run their SMEs in an unstructured manner thereby avoiding many of the features of professional management. These findings agree with several previous studies in the area (Berthelot & Morrill, 2016; Rambe & Makhalemele, 2015). The second research question sought to establish the effect that size of an enterprise has on BA adoption. The findings show that medium-sized enterprises are more likely to adopt BA due to greater access to resources and skilled staff than small-sized enterprises. Additionally, the findings show that medium-sized enterprises perceive greater business value from BA than small-sized enterprises as demonstrated by the fact that more respondents representing medium-sized enterprises than small-sized enterprises reported that they trained their employees on modern ways of obtaining and reporting information from customers on matters, such as product complaints, industry trends, and product needs. More respondents from medium-sized than small-sized enterprises also rated the contribution of BA to cost cutting and trust building more highly than respondents from small-sized enterprises. The third research question sought to establish the factors that influence the adoption of BA by SMEs in MENA region. Several factors were identified including: access to financial resources; awareness and access to information about BA; perceptions about the business value from BA; and availability of skilled employees. These factors are consistent with previous research (Ashrafi, Sharma, Al-Badi, & Al-Gharbi, 2014; Al-Gharbi & Ashrafi, 2010; Shehadi, Bitar, & Khoury, 2010; Al-Gharbi & Ashrafi, 2010; Ashrafi et al., 2014; Goebel, Norman, & Karanasios, 2015). The final research questions sought to establish the future of business analytics for SMEs in MENA region. This question was tied to the other three questions. Indeed, the current status of BA adoption by SMEs in MENA region shows there is great potential in this area as a large number of SMEs are yet to adopt BA solutions. Additionally, if SMEs in MENA region is to benefit from BA, they need to obtain greater access to credit and the awareness and information about BA needs to be spread further to counter the prevalent perception that BA adds no business value for SMEs. This study's findings lay a foundation for future researchers and provide useful information for policy makers about the current status of BA adoption by SMEs and the factors inhibiting its uptake. The study also provides useful information for SMEs' managers and owners, which they can use to enhance their competitiveness and efficiency.

VII. Recommendations

Based on the findings from this study, the following recommendations are made regarding the future of BA for SMEs in MENA region. First, access to credit for SMEs in this region needs to be enhanced through government policies and incentives. Second, there is need to enhance awareness about BA among SMEs in MENA region. Third, SMEs need to prioritize and invest in BA as it has the potential to improve their efficiency and competitiveness. There are many benefits that SMEs can reap from investing in BA. They include: quicker analysis of data enabling the enterprise to achieve deliverable solutions quickly; closer relations between the enterprise and customers as well as suppliers; lower running costs; and identification of KSFs by pinpointing causal relationships, thus enabling firms to understand the factors that drive financial performance now and those that might drive it in the future. These benefits can enable SMEs to compete locally, regionally, and internationally. The findings have shown that lack of access to credit is a major factor behind the poor adoption of BA by SMEs in MENA region. Consequently, governments in this region need to assume a leading role to facilitate BA adoption by enacting policies that ease access to credit for SMEs. The governments should also establish strategies of enhancing awareness about BA and incentives for promoting their adoption by the SMEs.

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