Value of Visual Analytics to South African Businesses

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Abstract. There is limited literature on the value that visual analytics provides for businesses, and its broad use in organisations. This research provides some understanding of how South African businesses are using visual analytics in their day to day operations, and the value derived from employing it. The study was interpretive, exploratory and descriptive, producing both quantitative and qualitative data. Individuals within organisations making use of visual analytics completed an online survey, and interviews were conducted with informed business, IT and BI stakeholders. Results were compared with those from an international survey, and thematic analysis highlighted four main themes: usage, value, challenges and technology. Most respondents noted the high added value obtained from visual analytics versus tables of numbers. The research also identified a set of good practices for organisations to employ when embarking on a visual analytics strategy and suggested ways of mitigating potential challenges.

Keywords: Visual analytics · Visualisation · Value · Benefits · Challenges · Business intelligence · Data · Change management

1 Introduction

For many years Business Intelligence and Analytics (BI&A) has been rated the largest and most significant IT investment internationally [1, 2] and the top technology priority [3]. However, the percentage of employees in organisations using BI&A is still very limited [4, 5, p. 88]. An essential component of BI&A is the appropriate presentation of data [6]; visual display of data allows users to gain more insight and draw conclusions timeously and easily [7–9]. Businesses find value in data visualisation because many users are more effective at recognising patterns in graphic representations of data than they are with rows of data in tabular format [10].

Visual analytics (VA) encourages effective and smarter decisions within a business [7, 9, 11]. VA incorporates the science of analytical reasoning and involves human cognition [12]. For the purpose of this research visual analytics will refer to the use of visualisation, human factors and data analysis to facilitate interactive visual interfaces of data from BI&A systems [12, 13].

VA research shows various business benefits, but users are not using it to its full potential to improve their decision making and analytical processes [9, 12]. Most VA studies are intended for designers and analysts, and few concern benefits of VA systems for users and managers [14]. The objective of this research is therefore to examine the

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usage of visual analytics in South African business organisations, and obtain some understanding of its value, related challenges, and suggestions for good practice.

Structure of this paper: Some background is given on the role of visual analytics in business, the value offered, and potential challenges. The research methodology then follows. After this, summary results of a questionnaire survey are discussed, together with themes emerging from interviews with practitioners of visual analytics. This is followed by recommendations of good practices for business organisations to follow in using visual analytics, and the paper then concludes.

2 Background to the Research

2.1 Analytics

Analytics is a subset of business intelligence used to support almost all business processes [15] and a broad term used to cover any data-driven decision [16]. It has three broad categories: descriptive analytics, predictive analytics and prescriptive analytics. From their surveys [17] confirm the great business potential for analytics, but note that it is not easy to obtain sustainable competitive advantage. For decision support purposes, data processed into information needs to be presented in a way most appropriate for the end user [18]. Different technologies can be used to present the data, such as OLAP, dashboards and scorecards, and visual analytics.

2.2 Visual Analytics

Over the years academics have used different terms for the phenomenon of representing data graphically, including visualisation, visual analytics, data visualisation, visual data mining, information visualisation, business visualisation, visual analysis and business information visualisation; many are used interchangeably [19]. For the purpose of this study the term visual analytics (VA) will be used, with the frequently–used definition: "Visual analytics is the science of analytical reasoning facilitated by interactive visual interfaces" [13, p. 4].

VA can be divided into three components, namely visualisation, data management and data analysis [20]. Data management integrates different data sources in order to analyse a consolidated view of the data [20]. Data analysis uses algorithms in order to transform the data [12]. Visualisation reduces the complexity of the data by breaking it down to a graphical form [9, 11, 21], using different types of images to represent information to users in a way that assists them to gain insight and draw conclusions [9]. Using VA for storytelling is recommended [22], while [23] describe VA as a translational cognitive science.

Discussing the application of interactive VA to decision-making and problem-solving, [24, p. 20] comment that it "differs from other forms of digital creativity, as it utilizes analytic models, relies on the analyst's mental imagery and involves an iterative process of generation and evaluation of ideas in digital media, as well as planning, execution, and refinement of the associated actions". According to [25], VA is useful to reduce the cognitive work needed by a user to perform a specific task.

2.3 Value of Visual Analytics in a Business Context

There is a great need in business to create tools that enable people to synthesise information and derive insight from massive amounts of data, provide understandable assessments of the current state of business, detect unexpected patterns within data and be able to draw conclusions that are a fair representation of the truth [12]. According to [9], business executives value the visualisation of data, and graphical data representations have the potential to be used throughout business organisations.

Well-executed VA can be of great value to businesses as it can turn the information overload into an opportunity, support smarter decisions, and provide a competitive advantage [9, 25]. The fact that VA reduces the cognitive work needed by users to perform tasks means that users have more time to focus on other aspects within the business [25]. "Visual analytics aims to put the human in the loop at just the right point to discover key insights, develop deep understanding, make decisions, and take effective action" [26, p. 328].

2.4 Challenges in Visual Analytics

Visualisation challenges are identified by [27] in three areas: human-centered, technical and financial. The first area includes interdisciplinary collaboration, evaluation of usability [28, 29], finding effective visual metaphors, choosing optimal levels of abstraction, collaborative visualisation, effective interaction, and data quality [25, 30]. Technical challenges include scalability [12], high data dimensionality, time-dependent data, data filtering, and platform independent visualisation, and parallelism [30]. It is difficult to analyse the data under multiple perspectives and assumptions to understand both the historical and current situations, and larger data sets are more difficult to manage, analyse and visualise effectively [25].

Limited research has been published on the usage of VA and its broad implementation in business organisations. The objective of this research is to fill this gap in literature by providing some insight into the application of VA in South African businesses. Given space restrictions, the focus will be on organisational and people-related issues rather than technology-related ones.

3 Research Methodology

The research adopted an interpretive philosophy and inductive approach, as the main aim was to gain more insight into how South African businesses were using and gaining value from VA. It was cross-sectional and both descriptive and exploratory, using mixed methods. Permission for the research was obtained from the university's research ethics committee, and organisational respondents all gave their agreement.

3.1 Questionnaire Survey

Non-probability purposive sampling [31] was used, by contacting organisations experienced in BI&A, and asking if staff involved in producing, deploying or using VA would be prepared to respond to a survey on VA. A questionnaire, based on questions in [9], was drawn up in Qualtrics survey software, with questions modified where necessary to suit the study and the South African context, and additional questions included. A cover letter and link was then emailed to the sample. Responses were checked in Qualtrics for completion, and exported to Microsoft Excel for further calculation and comparison with results from [9]. The intention was not for statistical comparison or testing, but rather to gain a sense of how similar the South African situation was to the international results of [9], and aid overall interpretation. There was some bias towards retailers, as many have their head offices in Cape Town, from where the survey was conducted. Table 1 gives details of the 35 respondents completing the questionnaire.

Table 1. Summary details of respondents to on-line survey

Industry	No.	Role	No.
Retail/wholesale/distribution	14	Data and IT professional	23
Consulting/professional services	5	Business exec/sponsor/user	6
Financial services	4	Consultant	6
Education	3	Total	35
Healthcare	2		
Telecommunications	2	**Number of Org. Employees**	**No.**
Software/internet services	1	More than 100,000	2
Government	1	10,000 to 100,000	10
Media/entertainment/ publishing	1	1,000 to 9,999	11
Chemicals	1	100 to 999	6
Oil & gas	1	Less than 100	6
Total	35	Total	35

3.2 Semi-structured Interviews

The next step was to conduct thirteen semi-structured interviews in order to gain a deeper understanding of the value that business organisations were deriving from using VA. The interview protocol was designed keeping the Technology-Organisation-Environment Model (TOE) in mind as well as the aspects that the researchers had found in literature [32, 33]. Interviewees came from business organisations making use of VA in some form, and were spread across the organisational spectrum from the technical, analysis and deployment side to users at different levels, as well as a consultant in this area. Interviews were almost all face-to-face and voice recorded, but video conferencing and telephonic interviews had to be conducted in a few cases. Table 2 shows the Job Titles of the thirteen interviewees, with the codes given to them.

Table 2. Job titles of interviewees with codes given

Code	Job title	Code	Job title
B1	CEO	H1	BI developer
B2	Head of market research	H2	BI analyst
B3	Business analyst	H3	Head of BI
B4	Business analyst	H4	BI analyst
B5	Data analyst	H5	Head of BI
B6	Consultant	H6	Solution architect
B7	Head of process development		

Interviews were transcribed and annotated from the recordings, and supplemented with the researcher's notes. The qualitative data was then analysed by employing the six step procedure for thematic analysis of [34] to describe both the implicit and explicit ideas within the data. Thematic analysis was done by looking for key words, themes or ideas within the data, with codes given to specific themes and sub-themes within the data to capture the complexities of meaning [35].

4 Research Findings

This describes the main findings from both the interviews and the questionnaire survey, which have been integrated to obtain as full a picture as possible. The main themes and subthemes emerging from the thematic analysis are shown in Table 3. Note that due to space limitations the theme of technology will not be discussed, and the focus will be more on the usage, value and challenges of VA to the businesses.

Table 3. Themes and sub-themes that emerged from thematic analysis of interviews

Theme	Sub-themes
Usage	Business usage, interaction and self-service, visual data discovery, and stakeholder involvement
Value	Integration and knowledge sharing, exception highlighting, decision support and faster actionable insight, and saves time
Challenges	User acceptance and adoption, lack of effective change management, lack of management support, lack of skills, and uncertainty of data quality
Technology	Data, data storage; and visual analytic tools

4.1 Usage of Visual Analytics

Business Usage. The percentages of online survey respondents replying that various business areas were using graphical representations of data are shown in Fig. 1.

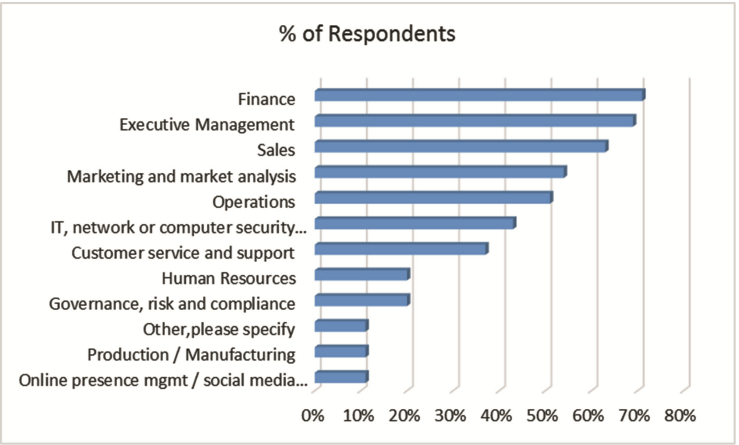

Fig. 1. Business areas using graphical representations of data (n = 35)

Interviewees made various points in this regard. B5 stated that their aim was to get *"every level of the company looking at these dashboards."*

H3 commented that in their organisation *"reporting we have over 2000 users so everyone from the store users till the top is exposed to it."*

H4 said it was important for them to have *"role based reporting to ensure that the information being displayed was relevant to the user."*

Many interview participants stated that their marketing departments found VA extremely appealing when analysing customer data. The data suggests that VA is a good way to "convert" business users who are less inclined to analyse numeric data.

Figure 2 compares the percentage of survey respondents in this study with those in [9] who said that VA was being used by various roles. It suggests a relatively good spread of VA across stakeholders and employees in the South African businesses.

Some points on the data itself: To the survey question: "what kind of data is being analysed and visually represented within your company" the percentage of survey respondents replying was: structured (91%), semi-structured (31%), unstructured (23%), machine generated (e.g. sensor, RFID) (11%), and social media (3%).

> *"our CEO and sales manager they require an entirely different sort of data view into this. I think for the company at large, for lower levels we are painting broad brush strokes, unless its specific data to their functions. So if its details, team needs to see their targets they need that info. Definitely from CEO and management perspective they need higher level decision making information"* (B5).

Interaction and Self-service. These were major reasons for the increased usage of analysis visually. B3 commented that *"I can drilldown, I can start at the highest level and drilldown, and it's cool as I have never had this before. We get excited about pictures and colours."*

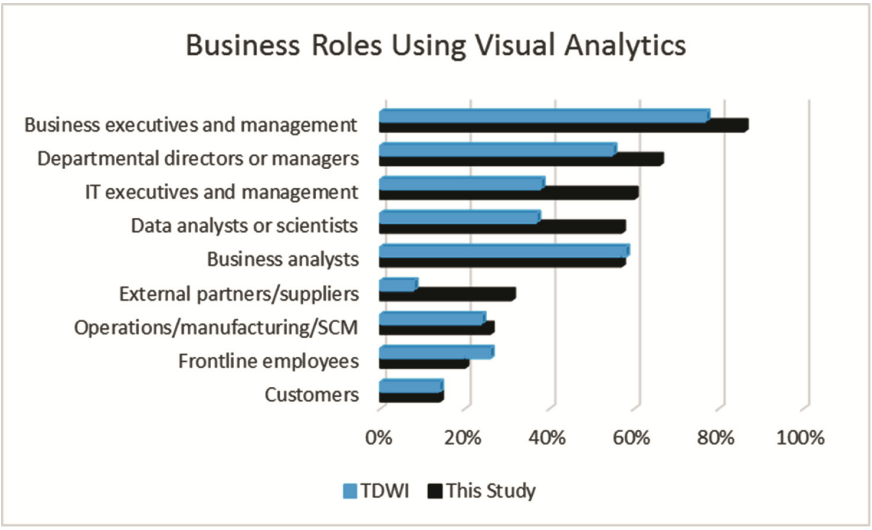

Fig. 2. Roles in the business using visual analytics (from two questionnaire surveys)

H2 said: *"Our VA platform supports decisions by allowing users to filter data, drill down etc. so, interact with data"*.

Visual Data Discovery. Interviewees highlighted that their organisations ventured into VA in order to create an empowering environment where business users would seek answers to their questions. The researchers observed a desire for VA to promote innovation as well as knowledge in the organisation. H5 commented that they wanted to *"empower users to analyse."* and *"We want innovation, we want users to see what we have given them and come up with innovative solutions to problems that arise"*.

Stakeholder Involvement. Stakeholder involvement was a key aspect that interviewees believed necessary for a successful VA strategy. H3 stated that they worked with the business units to ensure that they had all the necessary information before new visualisations were created for that particular business unit.

> *"It is important for us to work closely with business units so that we can ensure that what they are getting is relevant to them so that we don't waste our time or their time"*. (H2)

4.2 Value and Benefits of Visual Analytics

Online survey respondents were asked the same question as those in the TDWI survey (Stodder 2013). Figure 3 shows that the percentages of South Africans benefitting in various ways were not all that different from those of the international respondents. The top three items were the same, but South Africa was well behind in improving operational efficiencies, and in increasing employee and partner productivity.

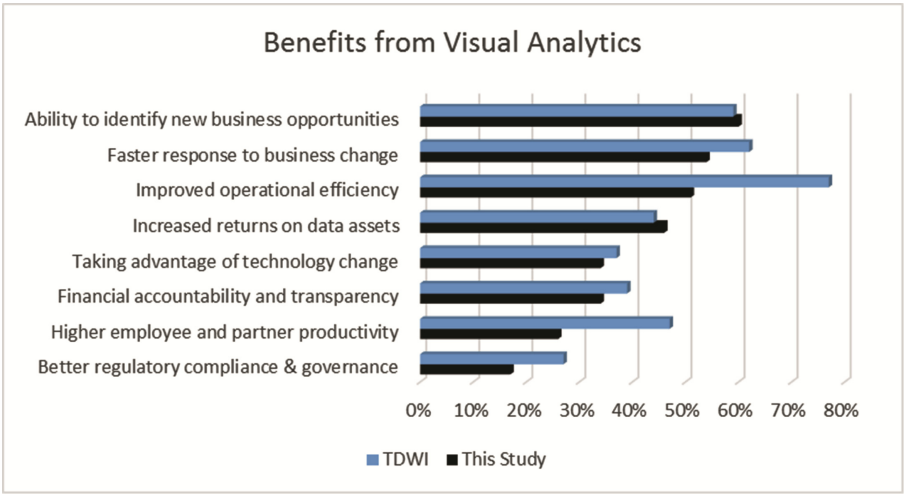

Fig. 3. Comparison of benefits from visual analytics in TDWI study and this study

Respondents to the questionnaire surveys were given the specific list of benefits in Fig. 3, whereas interviewees were able in conversation to define the actual value they gained from VA. This produced the following four main sub-themes of Table 3.

Integration and Knowledge Sharing. Interviewees felt that use of VA would allow each business unit to integrate better with each other. These often work in separate "silos" from each other, unaware of what is happening in the organisation as a whole. H4 commented that in their organisation *"each business unit has its own silos."* B5 noted that VA would "*promote cross disciplinary use, which would be good at fostering relationships there and getting a better context of the business and getting a better viewing to it"*.

Exception Highlighting. Interviewees pointed out that if there is unusual data within a data set, visualisations allow you to identify these exceptions or trends within the data. H4 stated that they *"want to highlight exceptions."*

> *"If you put the right visualisation, I think you can pick up anomalies more easily. Allows you to compare different periods of time,"* (H3).

Decision Support and Faster Actionable Insight. This sub-theme drew many comments from interviewees. Participants wanted to have actionable insight; VA provides a platform that allows business users to absorb information quicker and respond faster. VA facilitates root cause analysis through the ability to interact with the data that is displayed, to drill down into a transactional level. H1 commented that VA gave *"faster insight and a good understanding of the business at a high-level."* H3 highlighted that *"it's more about speed of access to information, ….. it's about asking the questions and how quickly and easily I can get to the answer."*

"So what I think it means for the organisation is more efficiency, more effectiveness in reaching our goals reaching our targets and I think a mind-set shift from anecdotal, information relying on tacit knowledge that's inside the mind of our team members, to data driven decision making which hopefully leads to more effective efficient and better decisions" (B2).

H5 stated that they *"want innovation, want users to ask questions about the data"* and want to use VA as a way to do *"visual storytelling, going to tell a story with data, what is the problem, use the data to tell the story and use visualisations to come to the conclusion."*

H2 commented that *"people are given more insight into the data"* and that VA "*supports decisions by allowing users to filter data, drill down etc. interact with data.*"

In the online survey the following question was posed: "*To what degree do visualisations of data improve business insight?*" Replies were split as follows: Very High (11%), High (51%), Moderate (37%), Low (0%) and Very Low (0%).

Because of concern that the benefits described might be largely due to analytics generally, as opposed to the visual aspect specifically, the following question was also asked in the local survey: "*To what degree do users within the company find value in using visualisation, compared to just numbers and tables?*" Answers were: Very High (17%), High (43%), Moderate (31%), Low (6%) and Very Low (3%), indicating that over 60% felt that visualisation was an improvement over conventional numeric presentation formats.

Saving Time. The data suggests that VA saves business users time. Employing VA, according to interviewees, allows organisations to streamline different processes and reduce the total time taken. B5 states *"up until now a lot of the work is automating manual processes, so people have been populating Excel spreadsheets and manipulating data. To cut down the time that they spend on this."*

"They previously used to take 21 days to get everything ready, and now they have it done within a few hours, so it has saved them so much time and trouble. It also saved them a lot of money as well" (B3).

"You can very quickly put results on the table it is not a long development life cycle and such and the business guys love it" (H6).

4.3 Challenges of Visual Analytics

User Acceptance and Adoption. Those interviewed generally agreed that the most pressing challenge they faced within their organisations was gaining user acceptance and adoption of VA. Many business users were familiar with tables that contained numbers and were reluctant to move to the visualisations presented to them.

B5 stated *"adoption can be a challenge especially in terms of the data, you need to, it needs to be as close to 100% as possible for people to trust what they are looking at."*

H2 commented that users were *"afraid that it may uncover information that they do not want other people to see"* and therefore *"some business units are unwilling to accept visual analytics."*

"some of the business users make use of it and then there is some of them that don't that stick to their old way of doing things. So there is a lot of change management in getting people to use the tool. And that's where the challenge is" (H6).

In order to encourage better user acceptance and adoption of VA, companies employed different methods. H2 said that their strategy to gain user acceptance and adoption "*was to remove their previous pdf generation and only give them the information they need visually. You know that people would revert to things that they know well if this meant that we had both the visualisation and the pdf. So by eliminating the pdf we have a higher adoption rate. But the users have also found, through this, that the visualisations hold a lot of value*."

Participants felt that if an effective change management strategy was enforced within an organisation, user acceptance and adoption would be less challenging.

Lack of Effective Change Management: This was regularly discussed throughout the interviews. Two different aspects of change management were mentioned: numbers to visualisations; and mind-set change.

Numbers to visualisations: Getting business users to use visualisations available to them instead of reverting to their table with numbers was a key aspect of change management that the researcher identified. Even though VA was available to various business users in different forms, such as dashboards, and visual analytic portals, users tended to revert to what they were familiar with. Many business users were not aware of the value or relevance that VA would deliver to their job functions.

H3 stated that: "*financial based people run the company and numbers are what they are used to and it is quite difficult to break through, they see a graph and it is difficult for them to see the number. They can see the spike but they want the number under it. It is change management actually."*

H4 said that *"Users will need to be trained in change management in order to move from A to B"*

B3 commented that: *"business users are used to seeing numbers, so that is a huge challenge to get them to think visually instead of number wise."*

B4 said: *"people prefer numbers so it is difficult to move them to visual images."*

B5 claimed that change management would involve *"sitting with various stakeholders and explaining to them how it is relevant to them. I think relevance is key. If people are not sure how it affects them they won't use it. Making them very aware that it will affect them and that they can rely on the data."*

Mind-set change: There is also a need for business users to adopt a different mind-set when analysing visualisations. Many business users lacked the correct mind-set to analyse visual forms of data, and those that were familiar with numbers felt that the visuals did not give enough information. H5 stated that *"end users are close to the numbers and are not using VA as they think it gets in the way, some people feel that it detracts from the actual value. When people are exploring data or are unaccustomed to data they use visualisations but otherwise they prefer grids with numbers"*

H3 stated that the problem will always be that *"users are reluctant to change."*

This confirmed that organisations need to have effective change management initiatives in order to effectively move business users from numbers to visuals, as well as make business users aware of the potential benefits of analysing visual representations of data.

Lack of Management Support. Interviewees believed that with management support, a clear strategy would arise for the organisation to move forward with VA, and stressed that if management was personally involved with VA they would be able to pass the behaviour down to the business users working under them.

B2 stated *"if line managers can understand how this data can impact performance for their team members then they can also run with it as well. So I would say that it's everyone but, also first and foremost the managers because if we expect someone to change their behaviour or change something, if their line manager doesn't buy into it and doesn't understand it then it's not going to happen."*

H6 commented that within his organisation *"need business, and a champion in business to push it"*, and B3 stated that it is important that there be *"management support and input."* B4 however said that VA was *"not driven from management but from the users saying they want and need it."* When asked what played a big role in the effective adoption of VA, B5 stated that senior management adoption was crucial to the success of VA within the company. Without proper management support for a VA strategy, organisations might struggle to get the correct business user acceptance.

Lack of Skills. A pressing challenge that affects implementation of VA in an organisation is the lack of skills. Some interviewees complained that the learning curve is so big that it takes them a while to derive value from the tools because they are unsure of what exactly they can do with the tools. There is also limited support given to business users to facilitate their interaction with the visual analytic tool.

B3 stated that *"Each application has a different way in which it can be used. We don't have the training and don't know how to use the tools."*

B5 said an issue was the *"lack of skills and knowledge"* around VA.

H5 commented that in order to make VA successful in their organisation there is a *"need for training of the users."*

To combat the fact that users lack skills to use visual analytic tools, H2 said their team ensured that the VA presented to the business user are easy to use, stating: *"developers try to make sure that the users can easily navigate by themselves by giving tips, etc."*

If there were effective change management procedures in place, involving user training then lack of skills would be less of a challenge. Developers of VA should also strive, like H2, to ensure that VA presented to users with little to no training, are easy to navigate and understand.

Uncertain Data Quality. In any aspect of business intelligence and analytics, this is a key area. Interviewees noted that for users to accept and trust VA the data had to be accurate. B5 commented that *"data accuracy is important"* and "*adoption can be a challenge especially in terms of the data, you need to, it needs to be as close to 100% as possible for people to trust what they are looking at"*.

H2 stated that *"data quality is always an issue for us."*

H4 identified that the challenge was *"cleaning the data"* because *"if the underlying data model is wrong then people will get the wrong information, therefore data models need to be cleaned."*

Each organisation employs their own data storage technologies and has their own way of handling data quality. Lack of data quality could also be a result of a number of different aspects, such as lack of controls or poor database structure.

5 Discussion

Results from both the on-line survey and the interviews indicate that a number of South African business organisations are obtaining good benefits from VA, and that VA is being used across different levels and stakeholder roles. While value is being obtained, there are still significant barriers to more widespread use of VA. Having looked at the main themes and sub-themes that arose in interviews, we suggest how these may be acted upon to address challenges and improve benefits.

5.1 Good Practices for Visual Analytics

Visual Analytics Strategy and Top Management Support. The most effective VA programmes are when top management supports incorporating VA into their corporate strategy. This then needs to be communicated to all stakeholders to ensure that VA can be accepted as a "way forward" for the company. If this cannot be achieved, it is still most important to have a defined strategy for VA, and a high level champion in business to push it. If top management is not driving VA within the company, business users are less likely to engage with it.

Stakeholder Involvement. For VA to be successful and for users to accept the new tools more easily, the individuals or teams developing these tools should ensure stakeholder involvement during the development process. There should be regular and strong communication between the developers and business users about business processes and the visualisations being created.

Effective Change Management. This could help to overcome challenges of user acceptance and adoption as well as lack of skills. Proper change management would involve ensuring that all stakeholders are aware of the move from tables of numbers to VA, and how it could be used within the organisation. If this involved effective training and motivation of relevant stakeholders then they would not lack skills, and would be more likely to accept and apply VA within their job functions.

Visual Analytic Tool Selection. Organisations need to ensure that tools are able to fully integrate into the organisation in terms of database storage technology and requirements analysis. One tool may not necessarily cater for all business units within an

organisation and multiple tools may be needed. A thorough proof of concept can establish how beneficial a VA tool will be to the organisation, and help satisfy return on investment (ROI) criteria.

Interaction and Self Service. Organisations that provide self-service to the users and allow them to interact with the data will cultivate a knowledge-seeking attitude within business users. This can generate enthusiasm and cultivate innovation within the organisation. Therefore, providing a VA tool that supports interaction and self-service is a key aspect to ensuring successful and widely used VA.

Role-Based Visual Analytics. Participants stressed that to encourage acceptance of VA, organisations should ensure that what was presented to users is role-based. Business users are reluctant to look at things that are not relevant to them, and therefore role-based presentation of data is important to ensure that the relevant information gets to the relevant level and type of employee.

Data Management Strategy. A clear data management strategy, with controls to ensure that data stored is of a high quality, and is well communicated to all stakeholders, will improve trust in the data and decision-making from VA. Data quality initiatives need to extend to unstructured and semi-structured data.

Exception Highlighting. Individuals or teams developing VA should create the visualisations in a way that highlights exceptions to the business user. This facilitates business users spotting when something is happening that should not happen, and will hopefully push them to try and understand what is wrong, and why. Exception highlighting is good for root cause analysis, and of course for also spotting "positive" anomalies and opportunities.

6 Conclusion and Recommendations

This study aimed to discover the value that organisations obtain from implementing VA and to obtain a better understanding of how VA is used within business. In doing so, both quantitative survey data and qualitative interviews were analysed. Although the smaller South African survey sample was purposive and not intended to be representative, comparative results obtained did not differ notably from those of the larger international survey by TDWI [9]. This suggests that many of the benefits and challenges uncovered may be applicable to a wide set of organisations internationally.

Respondents strongly recognized the extra value of VA over conventional numeric and tabular data. The benefits obtained from VA are both tangible and intangible, from changes in user behaviour, and encouragement of innovation, to better, faster decisions being made for the organisation. These benefits can be realised if the business takes the correct steps in integrating VA across technological, and also managerial and organisational aspects.

Organisations each face a different set of challenges but many of these are similar in nature. Challenges highlighted in this study were mostly organizational, rather than technology-based, as indicated in the literature reviewed. Broad use of VA is

problematic without senior management support and strategic underpinning. The relevance and benefits of a change to VA from historic numeric presentation formats need to be well communicated, with adequate change management and skills training. At the same time, many employees with low affinity for numerical calculations may be converted to analytics and data-driven decision-making by an appropriate visual presentation format.

Some good practices are suggested for practitioners of VA that could help make VA successful and more widely used within an organization. Further research could be undertaken with a larger sample, could include in-depth and longitudinal case studies, or be focused on experience with VA usage in specific industry sectors.

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