

Data-driven Storytelling: A competitive tool for Data Analytics

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Abstract: Data-driven storytelling continues to evolve and authors are developing new ways to support narratives with visualization. In this research we investigated the state-of-the-art in data-driven story telling, analyzing a large collection of data stories to identify the techniques that today's data-storytellers use. Hence to accomplish the above objective 116 employees from various companies namely Accenture, HCL, PCL food pvt. Ltd. were chosen as sampling unit in the study and data collected via questionnaire was analysed with help of correlation and regression analysis using SPSS. The study has indicated that big corporate institutions are aware of data driven storytelling and have aligned their strategies in a way that they are able to keep their best foot forward and make decisions accordingly. Also audience engagement was the main purpose behind data driven storytelling usage in most of the company. It is therefore evident that data driven storytelling is rapidly emerging as a probable tool not only to communicate and interpret the data to the potential audience but also to helps in audience engagement and innovation to the existing organization.

Keywords: *Digitalization, artificial intelligence, storytelling, data ecosystem, data economy*

1. INTRODUCTION

There's a huge amount of content on the planet; the normal organization is shelled with around 34 gigabytes of it every day. How would an organizations lice through the chaos and have an effect with the audience? By delivering quality marked content. The best marked content has both magnificence and substance, giving genuine incentive to your gathering of people.

A great part of the content prepared today contains brand informing, yet it doesn't convey that story compellingly. Information perception is an oft-ignored instrument that, when utilized effectively, can change the manner in which a story is told. Here are several reason as to why grasp data driven storytelling.

- (a) Stories with important data help individuals recall,
- (b) Add credibility,
- (c) Improve chances for media arrangements,
- (d) Uncover bits of knowledge into patterns and relationships or strange astonishments that enlighten crisp viewpoints.

Therefore it is vital to relate the right arrangement of data and storytelling. "Storytelling without data is a failure in itself. Data without storytelling is unmemorable. Data with storytelling is impressive. Data can engulf the audience , but the data itself is often the story. Moral writers know how to uncover and describe the consequences of data.

In the era of online marketing, big data and analytics are functioning innovation and productivity. Data will rapidly change how industries are creating value. And while every person apprehends that one has to involve with data in order not to be out-dated, it would be really difficult. Thus if an individual do not practice the right technology for the data needs it would be a distraction for the data analytics journey.

Data analytics mainly comprises of assembling data from diverse sources, mix it in a way that it is offered to be consumed by analysts and finally deliver data products useful to the organization business.

Data analytics technologies and techniques are broadly utilized in business ventures to empower organizations to settle on increasingly educated business choices and by researchers and specialists to confirm or discredit logical models, speculations and theories.

Most organization perceives that being a fruitful, information data- driven organization requires gifted designers and investigators. Less employees know how to utilize information to recount a significant story that resounds both mentally and candidly with a crowd of people. Promoters are in charge of this story; in that capacity, they're regularly the scaffold between the information and the individuals who need to take in something from the information, or make the decisions based on the analysis. Advertisers tailor the story to the group of observers and viably use information perception to supplement the interpretation. We realize that information is amazing. In any case, with a decent story, it's extraordinary.

We know that in the past business was run by experience, but no longer now. Appropriate data has the influence to cause intense change to how organization work and function in the decision making. With data, the organization is onto something that is as impactful and the organizations who do not engage with data would be affected in the near future.

We are seeing that organizations are generating more and more data and technology feed storage and these feed store can be exorbitant when an individual want to answer questions like ‘what does this date mean about customer 360’? Data analytics activities can empower organizations to shape incomes, improve operational proficiency, streamline showcasing efforts and client administration endeavors, react all the more rapidly to mounting business sector patterns and addition a focused edge over opponents - all with a definitive objective of boosting business execution. Reliant upon the specific application, the data that is observed can comprise of either certifiable records or new data that has been handled for continuous real time analytics uses. What's more, it can emerge out of a blend of inward frameworks and outer information sources(Roberta Turra, Cineca, June 2015)

Data analytics can likewise be secluded into quantitative information investigation and subjective information examination. The preceding includes examination of numerical information with quantifiable factors that can be looked at or estimated measurably. The subjective methodology is increasingly interpretive - it centers around understanding the substance of non-numerical information like content, pictures, sound and video, including regular expressions, topics and perspectives.

One must visualize data in order for their audience to comprehend it quickly through charts ,graphs, etc. Next could be presenting data in a manner that the viewer’s remember it for a long time. Gather the data first and honestly examine what the data reveals. Don’t make audiences struggle to understand what’s being shown. For complex visualizations, that may mean including captions that interpret the data. Connect the data to people so that it helps people remember the story. The ultimate is that the data persuades people to change their viewpoint. When done fine, data-driven storytelling offers an interesting and substantial blend of data and storytelling. The basic is to accurately stable data with the story (Daniel Waisberg,2014).

As individuals, we're all normally conceived storytellers. We associate better with our companions and clients and offer thoughts with the intensity of storytelling. Yet, finding the incentive in information and breathing life into that information for the intended interest group requires genuine exertion.

Data-Driven Storytelling benefits in increasing audience engagement. Once in a while, knowing the advantages and the plan of the item isn't sufficient for buyers to comprehend the estimation of the items or administrations. Everything comes down to the gathering of people. To know your gathering of people and what your crowd needs to gain from the communication with your image is basic in the event that you need to display data. If the data is “what” then the story is “why”. The story needs to spur your clients to make the ideal move. You have to set the story setting and fabricate a story that is anything but difficult to pursue, strengthening the key focuses and developing it in an approach to make it justifiable.

Many have just observed the advantages of data and analytics , at any rate in certain regions of their organizations. KPMG as of late reviewed in excess of 800 senior business administrators, and most revealed that utilizing data and analytics encourages them make quicker (86%) and progressively exact (80%) choices. Furthermore, 66% (67%) said utilizing data and analytics encourages them decrease business risk (Going beyond the data,2015)

One field where there has been wide and concrete advancement on the interrogation of data-driven storytelling is data journalism. News sites like Five Thirty Eight or the New York Time’s ,The Upshot have realized a fresh flow of consideration and awareness as a means of collaborating data-driven news to the public. By sensibly organizing the data and incorporating clarification to guide the consumer, journalists help lead users toward a legal interpretation of the underlying data.

2. LITERATURE REVIEW

Data driven storytelling isn't just about exhibiting numbers and knowledge. It is additionally about shaping associations with your objective clients. Every single report cannot be as data. It can be truthful information that is produced from research that form an assumption or produces any kind of solution. Different research and experiment on the identical topic can propose diverse data. But then again, if the data comes from a reliable foundation then the data-driven content will be an additional treasure in the customer’s judgments (Informatik Spektrum,2016).

Data storytelling is the practice of interpreting data analyses into layman's footings in order to have an impact in the corporate decision.B2B marketers know there is no deficiency of data rather the vast majority of us are flooding with it. Yet dealing with that data and utilizing it in new and imaginative approaches to interface with your intended interest audience is an alternate story and it requires a lot of effort.

During the times gone by, storytelling has been an in effect technique of transmission data and knowledge. Nowadays, data driven storytelling is on top of brain for information explorers of various types. The structure has advanced close by the improvement of better data analytical instrument. At the outset, individuals physically separated their data and distributed their investigation. And then the period of commented on, intuitive storyboards and relevant bits of knowledge. Also, today, we are progressing once more with the ascent of mechanized age of account bits of knowledge and reports (Henry Riche, Nathalie,2016).

Storytelling carries data to life ,consenting the viewer to make a special link to the information provided for them. Storytelling is vital to functioning with data because it has an assumption. It leads to a next action. It has a resolution. Companies can complete significantly more with their information in the event that they comprehend it superior to anything they do. While organizations keep on putting dollars in business insight (BI) and investigation devices, they aren't really getting the data that they need to improve their decision making (Carpendale, Sheelagh,2016)

Data storytelling meshes the data and perceptions into an account customized to a particular group of onlookers so as to pass on validity in the investigative methodology, trust in the outcomes, and a convincing arrangement of experiences that is noteworthy

to the audience. Compelling information narrating is a great deal like narrating for the most part. The information story ought to have a starting, a center, and an end. It ought to likewise incorporate a proposition, a speculation, supporting realities a legitimate structure, and a convincing introduction. However, very regularly, those in charge of dissecting information are unfit to introduce it such that's significant to the audience (Nowak, Stanislaw and Bartram, Lyn and Schiphorst, Thecla,2018).

Like great stories for the most part, information stories ought to be intended to have a planned impact, which might be to summon feeling, influence a sentiment, legitimize a strategy, or motivate further investigation. A powerful story incorporates a drawing in and opportune message, a point of view, an appealing perception, and the correct target group of onlookers. One motivation to recount to information stories, instead of utilizing customary information representations is to ease and speed up the basic leadership process. Information narrating is critical on the grounds that everybody is going after time and consideration with officials. Therefore it is fundamental to comprehend your group of onlookers and combine complex information into a significant and convincing story that can be worked upon so as to drive key choices and guide business procedure(Nathalie Henry Riche, Christophe Hurter,2016).

A lot of business knowledge use isn't close enough to the focuses where choices get made in the organization. Data narrating can separate that obstruction by truly associating individuals with what the information is stating (Fereshteh Amini ,Mathew Brehmer,2017).

Great information stories sufficiently incorporate data to express a case, however less data that the gathering of people battles to comprehend the point. Information stories should address a particular objective and depend just on information and discoveries that help that objective. Information storytellers ought to abstain from blurring their story with discoveries that don't legitimately address the goal of the investigation. Try not to occupy the group of onlookers rather keep the story clear, straightforward, and significant (Welbourne, Theresa, 2015).

Data driven storytelling is alarmed with actual statement nearby data through visualization. It shelters a crowd of setups to counterpart the variety of audiences, messages, contexts, data, and communication media.

Powerful data driven stories begin with powerful questions. Those questions should be relevant to the customers and the answers to those questions must be quantified.

The core-values of carving a story should not overlook certain core-values. They are important part in a journalist's craft and help in illustrating the data properly. The foremost thing to keep in mind is not firing number trails at the audience. Only illustrative portions of the data should be unpacked and explained which will not create a flooding of information. Next, all the tools that come in handy in describing the data to form a story should be decided in advance. Advanced graphs, pie-charts and interactive visual tools helps in deriving the key factor datasets which promptly tell the story. The tools will define the values which will vary according to the story you want to tell.

Further to this is determining the story telling approach which may be influenced by the story we want to weave and the choice plus data literacy among the audience. The data stories should be well spun while keeping these factors in mind. The audience should be able to interact with the data being presented to them. The interaction may come in form of instructions, audio-video guide, smart bots, downloadable files and the original sources. At a time when a lot of information related to the product starts flowing a fringe source of information may overwhelm the audience with exaggerating data. Every bit of information that we possess need not be shared, whereas selective objectives steer the information to a focus-driven story(Sheelagh Carpendale,2018). An example of Cognizant's Analytical Storytelling has been presented below. It showcases a data-driven storytelling where the core value of its functioning is turning insight into data applications. The fact-based storytelling method does away with the guess work and inspires proactive participation of all stakeholders to come to decisions that runs the organization. Analytical storytelling is the process of bringing data to life to tell a well- constructed narrative. Cognizant research paper highlights BARC's Market Research survey on 'Information Culture', where it suggests that data analytics and decision making are mutually symbiotic in only 4 out of 10 times. This survey tells us about the lack of bridge between data analytics and decision-making in the business ecosystem. Analytical storytelling helps in bringing forward the recommended action for the key stakeholders. The preparatory process for this is the exercise of data journalism. Since, journalism relies on proven data so the use of effective information processing tools comes into play. That is the point where data journalists enter the scene. Data journalism takes similar approach of investigative reporting to disburse information. A single version of truth is decoded once the exactness of data interpretation is proved. Analytical storytelling is the process that induces prompt and prudent decision-making capabilities into the organisation and assimilates the ups and downs and high and lows of the business (Analytical Storytelling: From Insight to Action,2017).

Further to this is the understanding of four P's which determines the way of communication with each stakeholder or interest group. Problems, Priorities, Perception and Personalities. The classification of the *Problems* into groups labelled by difficulty or size will help in finding the exactitude of the path which will lead the storytelling to fruition. The acknowledgement of the *priorities* will raise awareness, revenue, profit or the personal standing of the deciding body. The subject matter of the stakeholders should be *perceived* in its ominous capacity- its assent, dissent, past and future goals, etc. The *personality* of the stakeholder also steers the analytical story telling exercise into a dependent direction, of course the dependent being the reputation.

Two distinct ways can tell how Analytical storytelling is done.

- To drive organizational change management and alignment.
- To communicate within the context of the customer lifecycle.

Cognizant also partnered with a large North American insurance company to highlight the principles of analytical storytelling. It was recognized that key insurance and actuarial decisions are supported by data-driven information. In the company, challenges related to lack of relevant training and technological model changes rendered many analysts and specialized programmers obsolete. So, the first task in-hand was to reduce the existing workload of the existing victim team and enable them to focus on bigger challenges while submitting routine reports to the organization. The next task was to equip them with report-writing and visualization tools that allows them to manage routine tasks and gain control of their workload. A certain questionnaire was created to help look at the different dimensions created by the situation. The questionnaire came up with the data that helped understand the four P's of storytelling. Ultimately, by applying analytical storytelling, the company was able to transform the way it looked at a problem, shifting from cost reduction to value creation. Moreover, top executives of the organization were viewed as heroes for inspiring change across multiple stakeholder groups, from the analytics team itself to key business stakeholders (Analytical Storytelling: From Insight to Action, 2017).

2.1 Data comics as an example of data driven storytelling

Data Comics is a graphical storytelling technique centred on chronological pictures comprising of data-driven graphical images. The purpose is to construct appealing storyline about the data. My inspiration for using this as an example came from the recent focus on storytelling. The motive of taking this as an example is to both take help of the excess of present conceptions on the network as well as the aware graphic language of comics (IEEE Vis Week 2010 and 2011).

3. OBJECTIVES

- To determine the impact of usage of data analytics by companies, existing data ecosystem and barriers to development of data driven industry on data driven story telling.
- To determine predictive ability of parameters like usage of data analytics by companies, existing data ecosystem and barriers to development of data driven industry for determining usage of data driven story telling.

4. RESEARCH METHODOLOGY

4.1 Research Design:

The choice of research design is descriptive in nature.

4.2 Research Sample:

- *Sampling Technique:* Simple Random Sampling
- *Sampling unit:* The employees from various companies namely Accenture, HCL, PCL food pvt. Ltd. were chosen as sampling unit.
- *Sample size:* 116 respondents.

4.3 Mode of Data Collection:

For the purpose of study both the primary and secondary mode of data collection were used.

Primary source of data is known as unique source of data, where the data is first collected by the researcher in hand for a particular research objective, on the other hand, the secondary data is the one which is collected through the research papers, articles and many other sources.

The primary data was collected through the help of the survey. It is a self designed approved questionnaire to understand, how the data driven technology is benefiting the organizations in their decision making and what value is it creating for the organization. While sources secondary data include books, thesis, articles etc

4.4 Data Collection Tool:

The Questionnaire has been used as data collection tool designed on a 5 point Likert scale.

The Questionnaire is a set of questions with a variety of answers best suited for that question, formulated for the purpose of a survey or statistical study. There were certain sub variables used in the questionnaire that represented data analytics by companies, existing data ecosystem and barriers to development of data driven industry.

They are:

- *Organization Culture- Independent Variable*
- *Data Ecosystem- Independent Variable*
- *Innovation- Independent Variable*
- *Audience Engagement - Independent Variable*
- *Data sources- Independent Variable*
- *Challenges- Independent Variable*

Storytelling- Dependant Variable

4.5 Data Analysis Tool:

Correlation and regression analysis were used as data analysis tool using SPSS

5. DATA ANALYSIS AND INTERPRETATION:

This part offers the descriptive measurements of the data used for the study. The data Charts have been shown in this research to present the data. The data collected will be shown in the figures and tables and will be examined by means of frequencies and percentages. Spearman rank correlation and Regression analysis is used to inspect the degree of the relationship existing between variables and to attain the objectives.

The following tests are tested :Correlation an regression as data analysis tool using spss.

5.1 Reliability of Research Instrument

Reliability safeguarded that the research outcomes were reliably the same. The research safeguarded that the reliability of the questionnaire to outline its consistency in testing what it was intended to measure. The Cronbach's Alpha method was used for measuring the reliability.

Table 5.1: Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .909 | 38 |

From the above table, the Cronbach's Alpha coefficient is .909 for the 38 items that were analyzed together. The coefficient varies from 0-1. An instrument that is more reliable inclines to move towards 1 whereas an instrument that have a low reliability score moves close to or equals 0. Using the SPSS calculation, it point out that the research instrument used for this study is reliable compared to the generally acceptable score of 0.7.

5.2 Hypotheses Testing

To test the hypotheses, the spearman's rank correlation and the regression model were adopted. The reason is that the spearman rho or rs is used to study the relationship between variables and it also helps to show the strength and direction of the correlation.

5.2.1 Correlation

Null Hypothesis: There is no significant relationship between data analytics followed by companies, existing data ecosystem and barriers to development of data driven industry on data driven storytelling.

Alternate Hypothesis: There is significant relationship between data analytics followed by companies, existing data ecosystem and barriers to development of data driven industry on data driven storytelling.

Table 5.2: Descriptive Statistics

| | Mean | Std. Deviation | N |
|----------------------|-------|----------------|-----|
| Age | 1.93 | .935 | 117 |
| Organization culture | 27.19 | 5.019 | 117 |
| Data Ecosystem | 11.59 | 1.926 | 117 |
| Innovation | 15.51 | 2.333 | 117 |
| Audience Engagement | 3.95 | .899 | 117 |
| Data Sources | 15.09 | 2.421 | 117 |
| Challenges | 20.07 | 3.319 | 117 |
| Story telling | 23.49 | 3.841 | 117 |

Table 5.3: Correlation Analysis

| | | Organizat ion culture | Data Ecosystem | Innov ation | Audience Engagem ent | Data Sourc es | Challeng es | Story telling |
|---|----------------------------|--|-------------------|----------------|----------------------------|---------------------|----------------|---------------|
| Organizat ion culture | Pearson Correlat ion | 1 | .476** | .551** | .426** | .561** | .293** | .604** |
| | Sig. (2- tailed) | | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 |
| | N | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| Data Ecosyste m | Pearson Correlat ion | .476** | 1 | .542** | 0.117 | .297** | .278** | .266** |
| | Sig. (2- tailed) | 0.000 | | 0.000 | 0.208 | 0.001 | 0.002 | 0.004 |
| | N | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| Innovatio n | Pearson Correlat ion | .551** | .542** | 1 | .210* | .375** | .254** | .343** |
| | Sig. (2- tailed) | 0.000 | 0.000 | | 0.023 | 0.000 | 0.006 | 0.000 |
| Audience Engagem ent | Pearson Correlat ion | .426** | 0.117 | .210* | 1 | .343* * | .250** | .377** |
| | Sig. (2- tailed) | 0.000 | 0.208 | 0.023 | | 0.000 | 0.007 | 0.000 |
| | N | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| Data Sources | Pearson Correlat ion | .561** | .297** | .375* * | .343** | 1 | .312** | .603** |
| | Sig. (2- tailed) | 0.000 | 0.001 | 0.000 | 0.000 | | 0.001 | 0.000 |
| | N | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| Challenge s | Pearson Correlat ion | .293** | .278** | .254* * | .250** | .312* * | 1 | .295** |
| | Sig. (2- tailed) | 0.001 | 0.002 | 0.006 | 0.007 | 0.001 | | 0.001 |
| | N | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| Story telling | Pearson Correlat ion | .604** | .266** | .343* * | .377** | .603* * | .295** | 1 |
| | Sig. (2- tailed) | 0.000 | 0.004 | 0.000 | 0.000 | 0.000 | 0.001 | |
| | N | 117 | 117 | 117 | 117 | 117 | 117 | 117 |
| ** Correlatio n is significan t at the 0.01 level (2-tailed). | | * Correlatio n is significan t at the 0.05 level (2-tailed). | | | | | | |

5.2.2 Interpretation of Correlation:

As all the three variables are positively correlated with story telling and $p < 0.05$, hence null hypothesis is rejected. Thus there is significant relationship between data analytics followed by companies, existing data ecosystem and barriers to development of data driven industry on data driven storytelling.

5.2.3 Regression Analysis

Null Hypothesis: There three variable namely data analytics followed by companies, existing data ecosystem and barriers to development of data driven industry does not predict data driven storytelling.

Alternate Hypothesis: There three variable namely data analytics followed by companies, existing data ecosystem and barriers to development of data driven industry predict data driven storytelling.

Table 5.4: Model Summary^b

| Model | R | R Square | Adjusted Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-----------------|----------------------------|---------------|
| 1 | .706 ^a | .499 | .466 | 2.818 | 1.811 |

a. Predictors: (Constant), Challenges, Age, Innovation, Audience Engagement, Data Sources, Data Ecosystem, Organization culture
b. Dependent Variable: Story telling

5.2.4 Interpretation: Hence the independent variable namely data analytics followed by companies, existing data ecosystem and barriers to development of data driven industry explains 46.6% of variation in data driven storytelling

Table 5.5: ANOVA^a

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|-------|------------|----------------|-----|-------------|--------|-------------------|
| 1 | Regression | 853.038 | 7 | 121.863 | 15.341 | .000 ^b |
| | Residual | 857.928 | 108 | 7.944 | | |
| | Total | 1710.966 | 115 | | | |

b. Predictors: (Constant), Challenges, Age, Innovation, Audience Engagement, Data Sources, Data Ecosystem, Organization culture

5.2.5 Interpretation of Regression:

As $p < 0.05$ hence the null hypothesis is rejected. Hence data analytics followed by companies, existing data ecosystem and barriers to development of data driven industry predict data driven storytelling. And model is a good fit

6. FINDINGS

The analysis clearly reveals that usage of data analytics by companies, existing data ecosystem and barriers to development of data driven industry has an impact on data driven story telling as all three variables were found to have significant correlation with data driven story telling. Alongside all the three parameters were found to have predictive ability of parameters. The prediction equation to determine extent of usage of data driven storytelling can be calculation as shown below:

$$\text{Data Driven Storytelling} = 4.872 = 0.852 \times \text{Data Technologies} \quad (6.1)$$

Thus the study reveals that story telling is influenced by data driven technologies.

7. CONCLUSION

The study has indicated that big corporate institutions are aware of data driven storytelling and have aligned their strategies in a way that they are able to keep their best foot forward and make decisions accordingly. Also audience engagement was the main purpose behind data driven storytelling usage in most of the company. It is therefore evident that data driven storytelling is rapidly emerging as a probable tool not only to communicate and interpret the data to the potential audience but also to help in audience engagement and innovation to the existing organization.

Data-driven storytelling continues to evolve and authors are developing new ways to support narratives with visualization. In this research we investigated the state-of-the-art in data-driven story telling, analyzing a large collection of data stories to identify the techniques that today's data-storytellers use.

It was found that exceptional data-driven content began with convincing data. Fortunately, we live in a day and age where it is easy to get the information that we need. Data-driven content is not just about statistics, it is about how those statistics influence people. When data is created well, it provides a fascinating and convincing mix of data and storytelling. The crucial point is to accurately balance information with the story. Also one must remember that excessive numbers overwhelm and bore the audiences.

Thus in order to be attract your viewers than your competition, one must produce exceptional content. And combining relevant data is an tremendous way to do it. Data can help you put a certain topic in the limelight and give the topic a unique outlook. Also if we combine the data driven content with the right visuals, it can efficiently target both sides of the human brain. The data that we create will support the content, and the visuals will provide a better experience for the customers making storytelling a critical tool for success

8. SCOPE OF FUTURE RESEARCH

Since the study was conducted only taking few companies it could be conducted at different branches and also the comparative study can be undertaken across various sectors.

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