

Storytelling with insights



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Abbreviations

Acronym	Abbreviation
BI	Business Intelligence
EV	Electric Vehicle
GenAI	Generative Artificial Intelligence
KPI	Key Performance Indicator
NLP	Natural Language Processing
SOP	Standard Operating Procedure

Stories are 22 times more memorable than facts alone. People are much more likely to retain and act upon information that is presented as a story. When data is transformed into a narrative, it sticks. (Source: Stanford University)

Introduction

Business Intelligence (BI) tools have been used for decades to assist organizations with data analysis and reporting purposes. Conventional Excel reports have been replaced by interactive dashboards, making it simpler to track key metrics. We observe that modern BI development demands reporting go beyond visuals to offer narratives which explain “what and why” behind the data rendered. Narrative capabilities driven by AI and Natural Language Processing (NLP) enhance traditional dashboards in the following ways:

- Transforming complicated datasets into narratives that are simple to understand
- Providing context-based explanations instead of just numerical raw data
- Generating the key insights automatically, which in turn reduces the time of analysis
- Facilitating structured storytelling for better decision-making

However, the challenges of conveying the visuals and natural language articulation into a story must be overcome by the analyst on their own. Each analyst has to deal with the complexity of compiling the insights into their own narrative story.

“Every story is complicated until it finds the right storyteller.”

– Anonymous

“Data stories combine visualizations with narrative flow. This combination can breach the barriers between people and data, engaging the former and delving deeper into the latter.”

– James Richardson, Research Director at Gartner

69% of executives say data storytelling is important for decision-making, but only 24% of organizations have a strong data storytelling culture. (Source: PwC)

Despite the AI advancements in BI, organizations are still struggling with traditional dashboards. Major challenges include:

1. Time-consuming analysis – Business analysts must manually find patterns, trends and outliers and frequently sift through several reports to uncover the required insights.
2. Hidden insights are undiscoverable – The business outcomes could be heavily impacted if the crucial insights are overlooked without guided narratives.

3. Subjective interpretation - Multiple inferences can be drawn from a single dataset based on the expertise level, which may result in inconsistent decision-making.
4. Lack of storytelling - Although dashboards and charts display the data clearly, they often fail to draw connections between them in organized and useful for making decisions.

In this context, we want to share our experience with the different ways of communicating insights in an engaging way – preferably in a story narration structure.

Business challenges

Customer scenario - Finding the Root Cause Analysis (RCA) of a lower production in a manufacturing company

We are taking a representative manufacturing scenario wherein finding the root causes of the lower production is a key ask for factory manager. We simulated the data generation for a case wherein the production data across different quarters that include cars, bikes, autos, trucks and EVs were available. We had considered a specific scenario wherein the factory manager noticed a significant drop in the production for all vehicle categories variably across the quarters.

Our existing BI application could periodically collect these product data about manufacturing and show insights covering numerous KPIs or dashboard illustrating statistics. Like any other standard BI application, our BI application could hardly scratch the surface of the key problem of a factory manager, i.e., finding the root cause of a decline in production. The existing application was painful for the factory manager as he continued to struggle to analyze the charts to find out the underlying cause of the drop in production for all categories. This is indeed a painful scenario wherein the factory manager must analyze manually including the hidden root causes that lead to loss of productivity and acting quickly couldn't be possible all the time.

Operational inefficiencies and productivity loss

Time-consuming data exploration – Factory managers spend hours cross-referencing the data pertaining to machine performances, raw material imports or exports and operating shifts but face difficulty in identifying the exact problem flow clearly. This leads to heavy productivity loss.

As the data is spread across different categories of production, the raw data from the reports of these categories, each team may focus on machine performance analysis, absenteeism or electricity breakage, etc., wasting a lot of time in identifying the root cause.

Even after identifying the reasons for the lower production, the manager might find it difficult to correlate that reason to the lower production rate; they may take enormous amounts of time to find immediate actionable solutions.

This time-consuming and error-prone manual analysis without a proper flow creates operational disruptions and lacks immediate visibility in the production upliftment.

Traditional techniques of data wrangling and insights extraction methods often lead to high turnaround periods [1], which in turn have a cascading impact on critical decision-making. This may result in extended periods of productivity loss and higher operational costs.

Quality of outcome and interpretation

Inconsistent interpretations – With similar data, different groups of users may get contradictory conclusions which results in misaligned conclusions and contradictions.

Reactive vs pro-active decision making – Without equipping the AI-driven insights to dashboards, businesses could go according to past trends and make decisions instead of decisions pertaining to anticipating future challenges.

Loss of revenue and missed opportunities

Delayed insights – Factor managers couldn't respond fast to the immediate changes in the market because of slower manual analysis, which in turn results in late observations.

Missing anomalies – There are 'n' number of possible reasons for revenue leaks or abrupt changes in the demand that can't be noticed, which may severely impact the lines of productivity.

Uncertain revenue sources – Even if there is a drop in sales, dashboards cannot identify whether the dip is because of pricing or competitive factors or because of customer attrition, which is a crucial phase of business decisions.

Monotonous dashboard interpretations and a lack of storylines

With too much data, insights are lost – It is very difficult to extract meaningful conclusions all the time if the data is overwhelming or the dashboards are too complex in nature.

Lack of context- Dashboards usually show the direct trends in data, but they fail to explain how they could be aligned with business goals.

No clear problem-to-solution flow – Even though users can analyze and find the issues in data, there won't be direct guidance on finding solutions, which delays taking corrective measures.

Repetitive data processing in Standard Operating Procedures (SOPs) can lead to employee attrition or work dissatisfaction. These monotonous tasks could also lower productivity and employee engagement, which further impacts the quality of data analysis [2].

Difficulty in communicating data insights to stakeholders – Senior business executives always require clear and actionable stories instead of complex visuals. Without properly structured data narratives, it is tough to convey the complete story.

Manual validation of final decisions or tasks is highly susceptible to errors, which are prone to frequent reworks and can result in imperfections in analysis. These errors may lead to compromising data integrity and poor decision making.

Problem statement

Traditionally, BI platforms have been focusing more on conveying insights in terms of charts, visual aesthetics and no-code low code capabilities while defining the data modeling and processing. With the advent of GenAI, these platforms are also equipped with narrative capabilities, e.g., Copilot, recently. However, the application designers shall be great storytellers apart from their capabilities in the BI platform.

The following are the few inherent challenges that an application designer may still face while conveying story insights:

- 1. Placement of insights** – Factory managers may not be aware of the methods and processes for communicating the available insights in a particular order. At times, they may not have extracted the required insight at all in the first place. A gripping story should require the right placement of the right insights to convey a meaningful yet factual narrative.
- 2. Lack of engagement** – A great story requires a punching or shocking fact to grab the attention at the start. Subsequently, the story should bring the swing of emotions into the audience with a gripping sequence.
- 3. Setting up intermission** – Great story telling requires a good midway intermission to keep the suspense element of the narrative. Alternatively, the story should build up the problem to put the audience on the edge of their seats.
- 4. Linking the insights with a story** – A great story may interweave the insights and be relatable to each other and should able to bring a cause-effect relationship. Also, this requires a choice of using the right visuals while delivering the insights.
- 5. Great climax** – A great story may finally lead to a good climax, which is often an important actionable insight from the storytelling point of view. A presentation without actionable insight will disengage the audience and may jeopardize the entire efforts of engineering insights.
- 6. Difficulty in identifying KPIs or root causes** – Identifying the underlying insights from the data or through dashboards requires phase-to-phase analysis to come to a meaningful conclusion. This requires finding out KPIs or the root causes or the hidden insights from the data which couldn't be done quicker without guided narratives.
- 7. The trade off between overloading insights vs oversimplifying via a story** – A major challenge is in selecting the appropriate story, tailored to ensure the audience understands better and explores the data without missing the important details. Striking the right balance between overloading the details and oversimplifying is crucial for balancing the details and guiding the users for better decision-making.

8. Mapping the insights to storytelling tenants - In order to tailor the insights to the proper understandable storytelling style, the users need to have a good understanding of appropriate visualization and need to identify the core message with a logical structure. This mapping to correct storytelling style is important for a compelling understanding of the objectives.

Overall, the problem scenario demands a mix of storytelling process or style, alignment of insights to a selected story and utilizing the strengths of inherent capabilities of BI platforms.

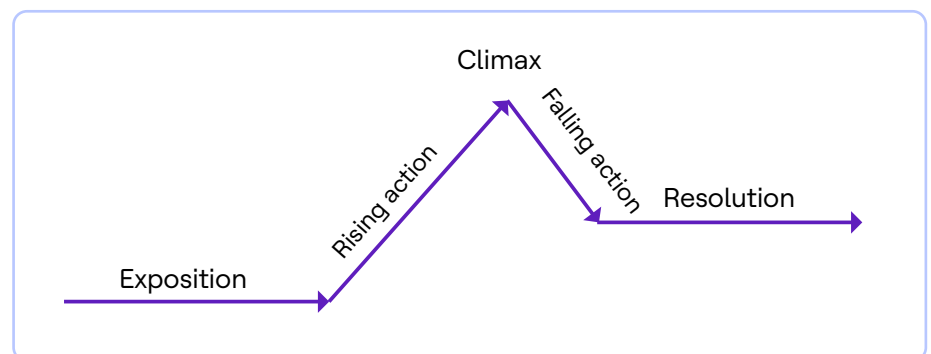
Solution

To address the above-mentioned challenges, we would like to propose a collection of best practices that we experimented with while delivering a great story. Our approach augments the mix of storytelling process and the use of BI platform capabilities to regular activities of a persona, i.e., factory manager in this case,

We carefully evaluated the available insights and capabilities of existing visuals to arrive at a storytelling approach that leverages three key telling approaches:

Visual storytelling, interactive exploration and linear narratives. We can deliver a story – ensuring that the insights are not only visualized interactively but also explored in a narrative-driven format.

In order to deliver the story in a dramatic way, we explored the option of conveying the insights through Freytag's Pyramid structure [3] in delivering the story.

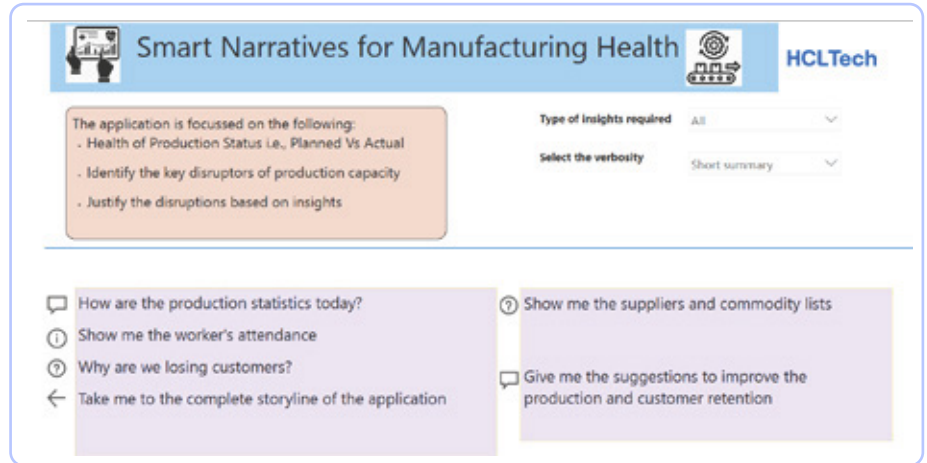


Freytag's Pyramid structure follows five stage process in conveying a dramatic story structure. This pyramid brings us a foundational process of delivering a story. Our approach leveraged this foundational process, i.e., story delivery structure and explored how different types of insights can be aligned to this structure.

Let us illustrate our journey in delivering the story with this five-stage process using our specific use case, i.e., finding the root cause of lower production in our manufacturing scenario.

1. Exposition: The first step of an engaging story is to set the context. We used an introduction landing page of our BI application aimed to answer some specific pain areas of factory managers. One may design a landing

page covered with a set of questions that factory managers would want to find the answers to on a regular basis. An illustrative page (not for exact or ideal representation) can be shown below:



The factory manager would typically start his journey by looking into various health of manufacturing interests through these questions.

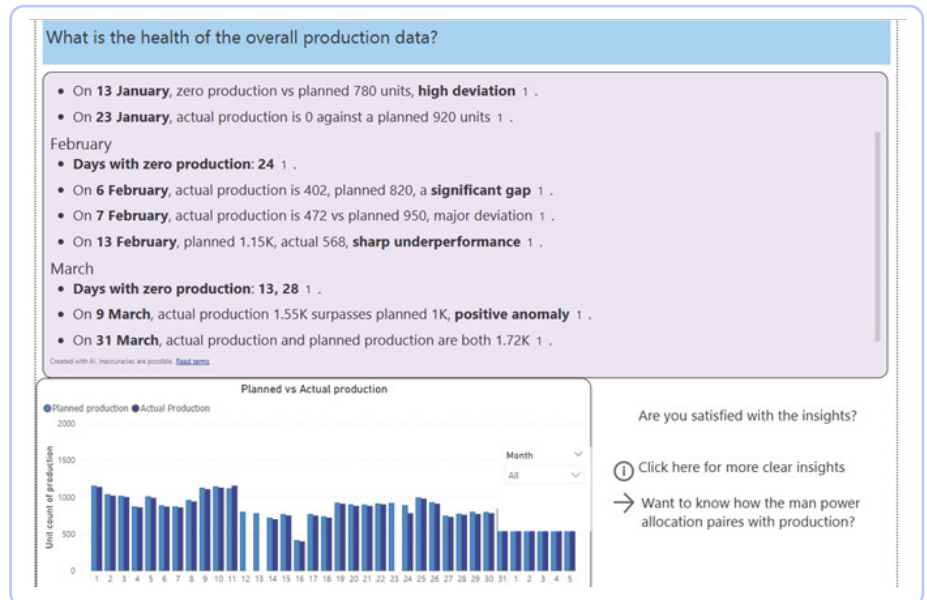
2. Rising to action: The second important stage of a story requires grabbing the attention of the audience. A great story needs a hook to grab the attention. A hook can be described as any of these below:

- Any abnormal events or situation
- Shocking facts or key numbers
- A famous quote that may bring emotion

In order to deliver a hook, we can use

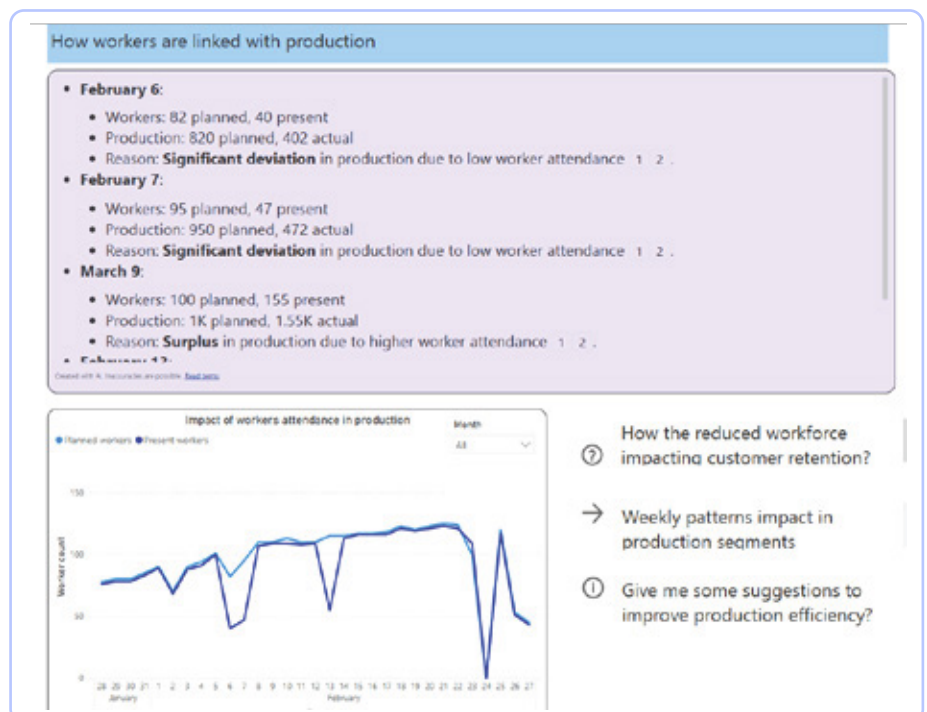
Hook examples	BI techniques
Abnormal events or situation	Anomalies through standard deviations or ML model that can detect anomalies dynamically.
Shocking facts	Representation of card visuals to highlight the key numbers. We need to ensure the number should again deviate much from normal.
Famous quotes	We may use GenAI models to respond with a relevant quote that may best represent a visual chart. The approach is still in the exploratory phase and the quality of the quotes may vary from one scenario to another.

We used anomaly detection models that are best suited for data-driven hook delivery, given the possibility of high response probability from the audience. Our representational chart for anomaly detection is provided below:



We used the built-in narrative capabilities of the BI platform to deliver an anomaly in a narrative style. Such articulation can be a proven approach as compared to the counterpart of starting with lackluster visuals/dashboards.

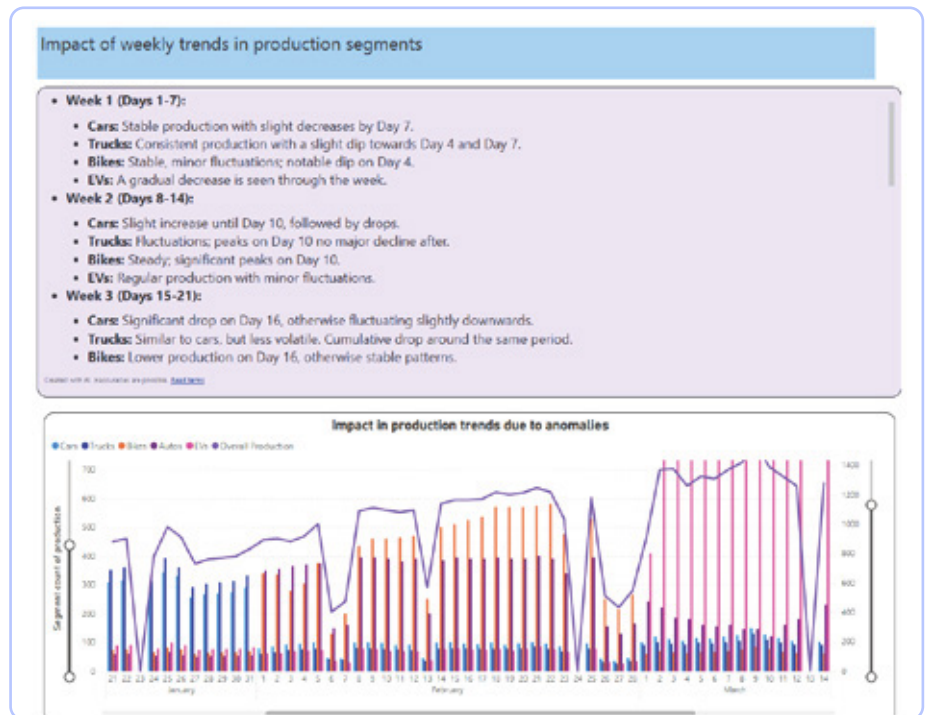
3. Building a peak interest/climax/suspense: This is the third stage, where the factory manager observes the discovery of the hook leads to another problem. He observes that the worker’s attendance drop is impacting the production rates heavily. The underlying patterns of absenteeism reveal that production dropped heavily following the days of holidays or spiking in specific operational shifts.



In this phase, an audience (factory manager) reaches a peak sense of confusion and chaos that might lead him to be full of questions rather than an answer. In order to deliver this phase, we can use pattern mining, trends and line chart visuals that may further provide the underlying reasons for the anomalies, which reveal patterns or trends existing which may curate

within the subsets of data. This building-up of problems helps in finding the potential causes and further sets the stage for finding the root causes of the problem.

- 4. Falling action:** This is the fourth stage of storytelling; we typically start demystifying the puzzle and start moving towards reasons. We can use segmentation, classification and categorization of insights into better granular segments, assisting users in identifying exactly where the problem exists or where the solution opportunity is most noticeable. By finding out the root cause of the problem within the data segments, the users can proceed with the most critical issues that cater to fewer but specific segments.



In the above illustration, the factory manager observes the unfolding of various insights as relations and reasons behind the underlying problems. These insights further break down the problem with the affected production lines (like EVs or Bikes) and the worker shifts relating to those segments, which are affected by absenteeism heavily. This helped in narrowing down the problem to address the critical production line.

- 5. Conclusion or catastrophe:** In the last and fifth phases, we recommend showing the final root cause of the key problem along with the recommendation insights. We identify the most significant factors influencing the performance, whether they are on a positive note or a negative side. These influencers consolidate the analysis of earlier insights (discovery, patterns or trends, segmentation) and answer the critical question, "What should we do now?". They also help the users to clear the decision pathway by bringing up actionable recommendations.

How the lesser workforce and production impacting the customer retention?

Reasons for Decrease in Customer Retention in February:

- **Worker Unavailability:** Significant worker absences on February 6th (82 planned, 40 present), February 7th (95 planned, 47 present), and February 13th (115 planned, 55 present) impacted production. 1
- **Lowest Retention:** February retention drops from 100% initially to 3.70% by the seventh cohort. 2

Immediate Actions:

1. **EVs:** Prioritize EV production to manage customer expectations effectively and enhance retention.
2. **Cars:** Implement temporary worker shifts or hire additional staff to meet car production demands.

Created with AI. Feedback and prompts: [Feedback](#)

Customer retention - Cohort chart

Month	0	1	2	3	4	5	6	7	Total
January	100.00%	29.17%	20.83%	16.67%	16.67%	12.50%	4.17%	4.17%	100.00%
February	100.00%	61.11%	42.59%	29.63%	27.78%	14.81%	11.11%	3.70%	100.00%
March	100.00%	41.27%	33.33%	22.22%	20.63%	12.70%	4.76%		100.00%
April	100.00%	56.16%	38.36%	30.14%	15.07%	4.11%			100.00%
May	100.00%	48.45%	35.05%	30.93%	14.43%				100.00%
June	100.00%	52.63%	35.53%	19.74%					100.00%
July	100.00%	49.40%	22.89%						100.00%
August	100.00%	28.36%							100.00%
September	100.00%								100.00%

In the above illustration, the factory manager is shown with the cohorts of identifying influencers, suggesting actionable recommendations like adjusting worker shifts, offering focused incentives for periods of high attendance, enhancing employee engagement programs etc., The influencers also focus on decisions to be taken for immediate rerouting of the lower production segments like EVs or bikes to meet the planned production schedules.

By incorporating the above storytelling structure with narrative insights, one can not only identify the underlying hidden problems but also immediately understand the effects of taking timely actions to optimize the production performance. Narrative insights focuses on transforming traditional dashboards into smart and AI-driven storytelling pathways, which ensures the proper way of identifying and solving a problem with an improved persuasion or approval rate among the target audience.

Benefits

We want to emphasize the importance of delivering insights within the storytelling process, as we could witness the proven benefits of utilizing the storytelling tenants as part of delivering insights in our various customer engagements. The above illustration reflects our past experiences and we could realize the following benefits in our customer scenarios:

- Improved clarity of thought, purpose of the insights and communication delivered
- Leveraging the mix of insights in the right order reduces the time to deliver the key messages – from weeks to days
- Better persuasion or approval rates of the target audience
- Improved decision making and faster resolution – mean Time to resolve
- Every stage of insights extraction has strong forward and backward correlations, hence improving the credibility of insights
- It helps to simplify complex problems into manageable solutions

- Improved accountability of problem-solving from end users to app designers
- Improved retention of information/insights delivered through stories

Conclusion

Storytelling with data has been gaining increased momentum in the field of data analytics. The advent of narrative capabilities within BI platforms gave a tremendous opportunity for application developers to define and deliver storytelling frameworks.

We at HCLTech specialize in this field of storytelling with insights. We augmented this unique capability on top of our existing data analytics offerings by defining a solution framework, point of view to specific customer problems and thought leadership[4]. We witnessed that close to 30-40% of our current customers are already willing to invest in this capability and co-innovate with us. We are hopeful to witness this trend even getting stronger as the natural language generation capabilities mature.

We continue our commitment to extend our research more on this mission of simplifying insight generation and delivery as part of democratizing the value of data.

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