The Savvy Leader's Guide to Evaluating Modern BI and Analytics Platforms

Table of contents

01 /

Introduction and scope

This document is intended to be used to evaluate modern, sometimes known as self-serve, business intelligence (BI) platforms. The focus is on mid to large enterprise use, but the document recognizes that many mid to large enterprises start with smaller projects which strongly resemble the SMB and startup community. As such, this guide provides assistance to anyone who wants to choose a modern BI platform for business.

02 /

Business context

BI solutions have no value unless they help to drive the success of a business. Businesses are driven by processes. Discussed below is a taxonomy of seven different business process types which are differentiated by their form and frequency of use. This taxonomy will be used to further clarify differing BI solution patterns which will aid the reader in making an informed BI decision.

Business process types

In order to make an informed decision about a BI platform, it is important to understand the business processes that are to be augmented with insights from the BI platform. Described in Figure 1 are seven different core business process types based on their form of execution and their frequency of use.

All business processes embody one of three different forms of execution: ad hoc, semi-structured, or structured. Ad hoc forms of business process execution have no known repeatable pattern and are considered free-form. Semi-structured forms of business process execution have some expected repeatability and, hence, execution is necessarily shaped and guided by an execution framework. Structured forms of business process execution are expected to be highly repeatable and, hence, are always rigorously defined via a rigid set of execution steps and rules.

There are countless reasons why any given business process takes on one or more of these three forms, but to ensure clarity of understanding consider by example that exploration and discovery reporting may correlate to ad hoc business processes, regulatory compliance reporting may correlate to structured business processes, and reasonably well understood manufacturing yield reporting may correlate to semi-structured business processes.

Frequency of execution for ad hoc business processes may be either executed one time, repetitively executed, or continuously executed depending on business needs. Frequency of execution for semi-structured business processes, enabled by the execution framework which requires some degree of forethought and investment, is either repetitively or continuously executed. Frequency of execution for structured business processes is also either repetitive or continuously executed. Correspondingly, it is unlikely that any business process form that is either semi-structured or structured will only be executed one time.

Generally, complete end-to-end business processes are often composed from combinations of these core business process types. Consider, as an example, the conception, design, engineering, manufacturing, and delivery of a new product. The conception workflow may be very ad hoc in form and executed only once, the design workflow may be similarly ad hoc in form, and executed continuously as refinements take place, the engineering may be semi-structured in form and continuous in execution from initial prototype to field testing, the manufacturing may be structured in form and repetitive in execution based on governance and batch execution, and the delivery may

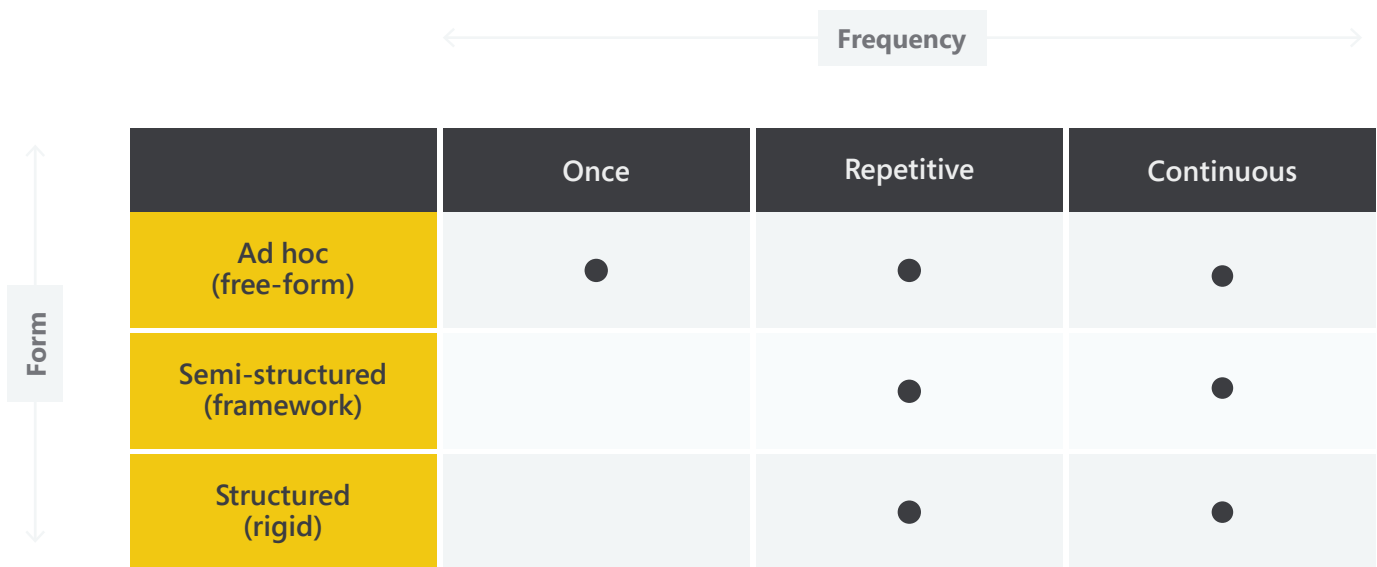|		Frequency		
		Once	Repetitive	Continuous
Form	**Ad hoc (free-form)**	●	●	●
	Semi-structured (framework)		●	●
	Structured (rigid)		●	●

Figure 1: Business process types – form and frequency

be semi-structured in form and repetitive in execution when testing the market in early days of the products lifecycle. There are countless combinations that might occur, but the seven basic business process types can be used to describe them and, ultimately, as will be shown later, are useful in better understanding where differing types of BI are needed and how they may need to be employed.

Workflow model basics

All seven business process types in Figure 1 share a common workflow model. First, they all include the ultimate goal of delivering a business outcome. All business outcomes are measured for their success or failure against the establishment of a corresponding business objective. To transform business objectives into business outcomes requires business execution. No workflow exists in a vacuum. No matter how isolated, there are always external factors that may need to be considered in the workflow. This amorphic set of potential external factors is considered to be the World.

These four items make up the basics of all workflows as shown in Figure 2.

World
What is happening elsewhere?

Figure 2: Workflow model basics

Objective: Defines the Outcome goal(s) of a workflow.

Execution: Defines the actions used to transform an Objective into an Outcome.

Outcome: Defines the actual business result that is meaningful and improves one or more business metrics (as distinct from an output which does not necessarily describe the value of a business result.

World: Defines external factors that, if understood, may influence the Objectives, or the Execution, or both.

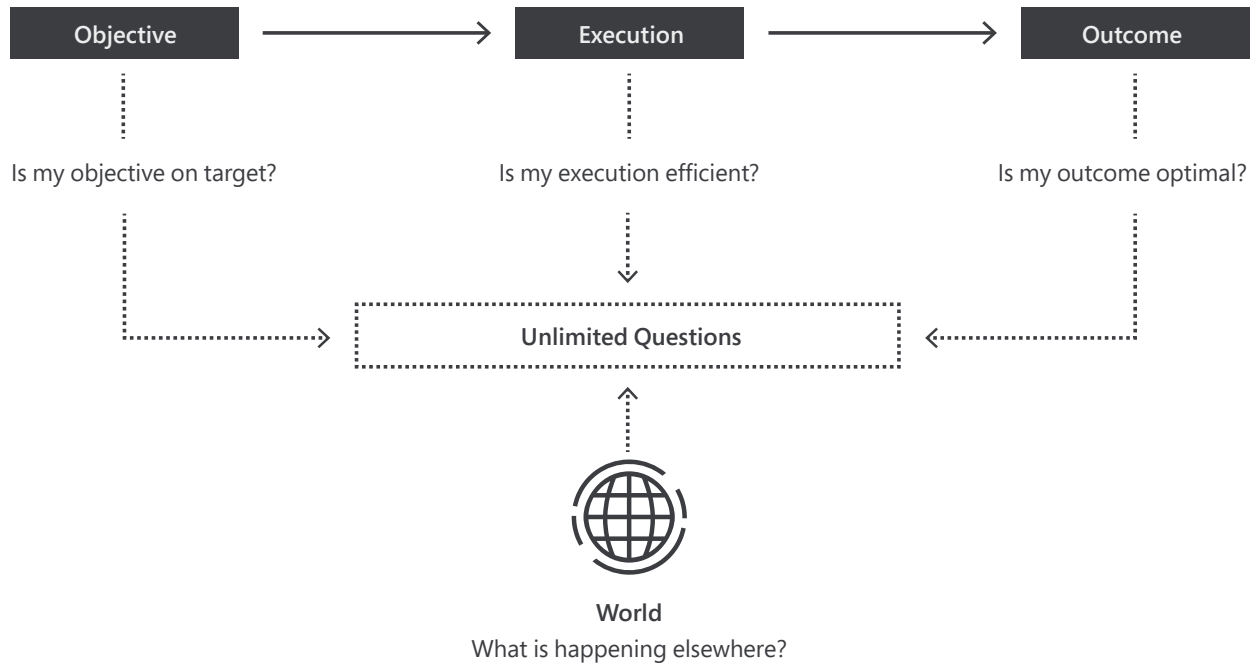# Workflow model basics leads to unlimited questions

Figure 3: Unlimited questions in workflow model basics

All business process types of Figure 1 and their corresponding workflow basics outlined in Figure 2 leads to questions that must be answered to ensure success. These questions, while literally unlimited in scope and countless in number, can all be categorized four-fold and are shown in Figure 3 and briefly discussed below.

Objective: Is my objective on target?
Are the objectives set for my workflow relevant, achievable, and impactful? Examples may include:
- Defining a new product with expected growth of market share
- Expanding a business to a new geography with intent to grow revenue

Potential impact of World
Has the ever-changing world caused the objectives that once made sense to now be irrelevant or, worse, perhaps now be destructive to the business? Examples include:
- Competitors releasing new products with the same idea
- Social response to a new regulation that has gotten traction since the original concept was established

Potential impact of Execution

Are my objectives actually achievable given my current state of the art for execution, or do my objectives represent unachievable outcomes that will end up causing my business to fail? Examples include:

- Manufacturing yield is not what was expected and, therefore, costs may not be aligned with revenue expectations
- Availability of a new service may be less than expected in Beta release and, therefore, customer sentiment is falling.

Potential impact of Outcome

Is the outcome from my workflow meeting my objectives? If not, do I understand why? If my workflow is actually over-achieving on an outcome, how do I adjust my objectives to take advantage of this? Examples include:

- Customers are not accepting a new product as was predicted
- Product quality based on returns is not as expected

Execution: Is my execution efficient?

Is the execution of my workflow going to lead to the outcome that was expected for the objectives defined? Examples include:

- Manufacturing yield not meeting requirements
- Engineering teams not delivering new features consistent with the published roadmap

Potential impact of Objectives

Is the objective for my workflow consistent with my expected execution capability? Examples include:

- Objective too aggressive for the existing manufacturing capacity
- Feature roadmap compared to what the engineering team seems to be delivering?

Potential impact of Outcome

Is the outcome for my workflow representative of my expectations from execution? Examples include:

- Selling prices not covering operating expenses
- Geographic mis-alignment between the execution location and the consumption location

Potential impact of World

Are others in the world finding better ways to execute compared to my objectives? Examples include:

- Other businesses are using less resources for their competitive offering
- The time to market for new features is not in line with the competition

Outcome: Is my outcome optimal?

Is the outcome of my workflow consistent with the expectations set by my objectives assuming my execution is having no unexpected impact? Examples include:

- Profit margin is below target
- Staffing levels worldwide are not aligned with worldwide revenue

Objectives impact

Are my objectives actually achievable given my current state of the art for execution, or do my objectives represent unachievable outcomes that will end up causing my business to fail? Examples include:

- Expected selling price is too high causing prospects to abandon the engagement
- The published goal of a new product package release every quarter is causing dissatisfaction when compared to actual release schedules

Execution impact

Is the execution of my workflow causing a gap between the expected outcome and the objective? Examples include:

- The quality of the product, as manufactured, result in a defect return rate that is below the objective
- The operations team is not able to triage problems fast enough to meet the availability objectives

World impact

Is the world reflecting on the outcome in ways that were unexpected by the objectives?

- The outcome is no longer competitive
- The outcome is leading to negative trends on customer sentiment

Unlimited questions summary

It is these sorts of questions that must be considered regarding their potential impact on the workflow. Some questions may not matter at all even though they can be answered while understanding and responding to other questions may be the difference between success and failure. Further still is the ability to generate new questions and their answers based on hints from answers to questions first postulated.

Closing the loop with intelligence

To determine which of the unlimited questions that are constantly being created are truly important, and to then answer those important questions, it is imperative to exploit the ever growing, ever expanding flood of data that is available across the workflow. Quick, accurate, comprehensive understanding of the questions and extraction of the best insights possible will allow for timely adjustments on objectives and execution to then ensure optimal outcomes. This must be done in a manner that is consistent with the flow and frequency characteristics of the business process workflow types, outlined in Figure 1. To do this, we add business intelligence as a feedback system into the business process as shown in Figure 4.
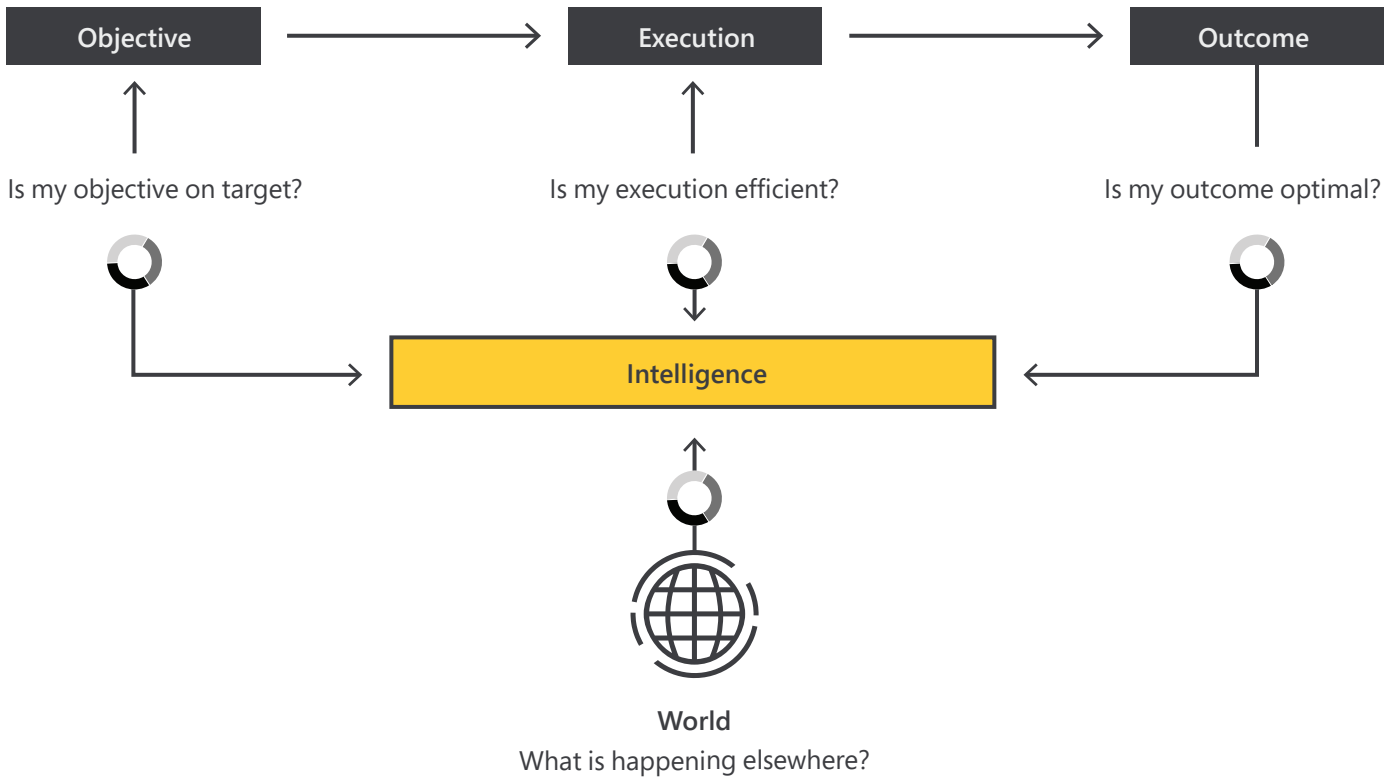
Figure 4: The role of intelligence in business workflow

Business intelligence workflow actions: Create, Consume, Govern

Augmenting workflow basics with business intelligence is not new. It has been a core objective of computing since the invention of the computer. The approach, however, has evolved as IT architecture has evolved. At its core, business intelligence is founded on data, and requires three BI workflow actions to make the intelligence real: Create, Consume, and Govern as shown in Figure 5.
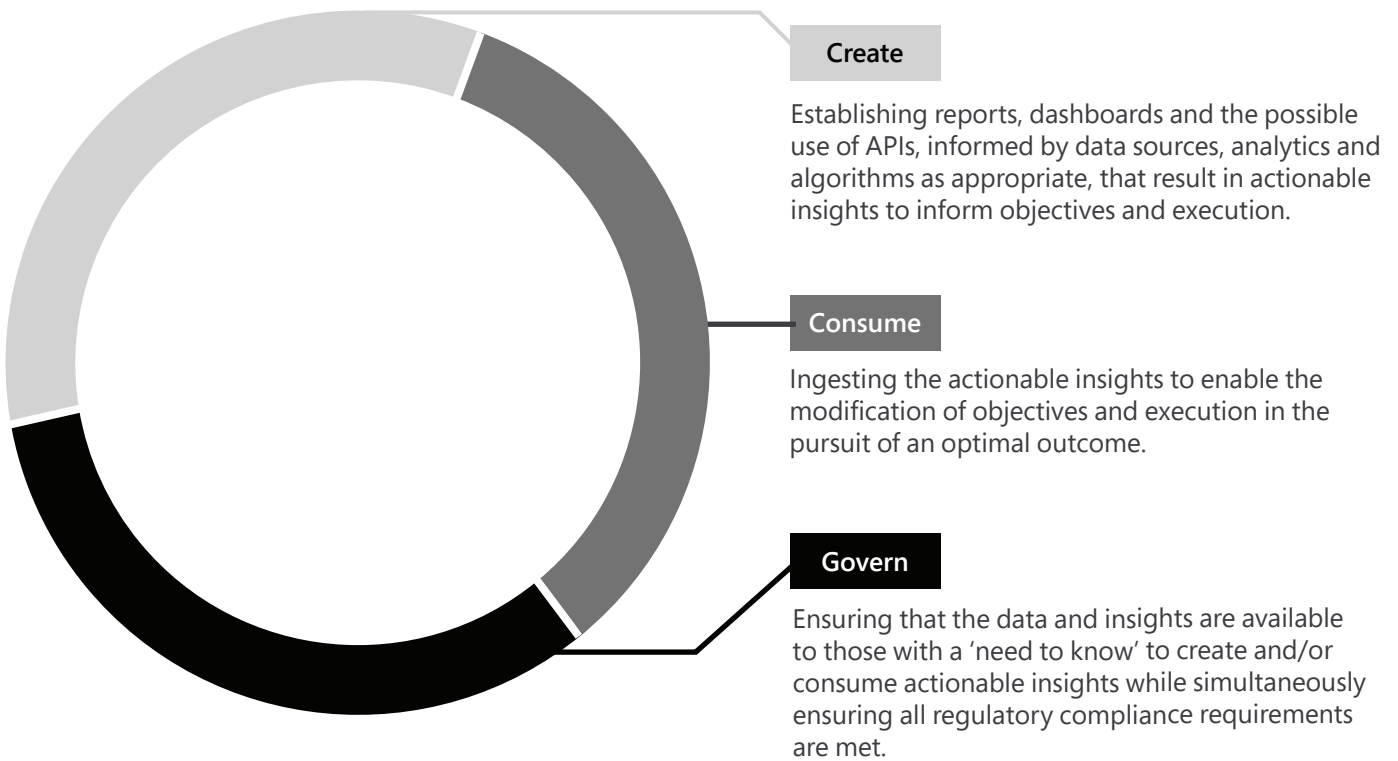
Create

Establishing reports, dashboards and the possible use of APIs, informed by data sources, analytics and algorithms as appropriate, that result in actionable insights to inform objectives and execution.

Consume

Ingesting the actionable insights to enable the modification of objectives and execution in the pursuit of an optimal outcome.

Govern

Ensuring that the data and insights are available to those with a 'need to know' to create and/or consume actionable insights while simultaneously ensuring all regulatory compliance requirements are met.

Figure 5: Intelligence Workflow Actions: Create, Consume, Govern

Roles

To perform the BI workflow actions of create, consume, and govern requires the consideration of three top level roles performed by the user(s) of the platform: the BI role, the LoB role, and the IT role. Each of these roles is described below. These roles are often described with varying terms based on industry, type of solution, and more. Some examples are given, but the list of examples is virtually endless across all types and sizes of businesses.

BI Role

This role represents a focus on finding insights from analysis of a variety of data and derived content. Some BI example roles include:

- Analytics Strategist
- Analytics Infrastructure Support
- BI Professional
- Data Analyst
- BI Developer
- Business Analyst
- Data Scientist

LoB Role

This role represents a focus on the business processes and, correspondingly, not on IT or BI. Some LoB example roles include:

- Human Resources (HR)
- Marketing
- Sales
- Service
- Financial Operations

IT Role

This role represents a focus on implementation of the systems that serve both the LoB and BI roles. Topics such as governance, performance, security, privacy, and integration are typical of an IT role. Some example IT roles include:

- On premise Administrator
- Cloud Administrator
- IT Infrastructure Support

Users are distinct from Roles

The roles defined above may be embodied by as little as one person, or embodied by specialists fulfilling each of the roles such as a departments of data scientists, non-technical domain specialists, IT engineers, etc.. The alignment and specialization of users fulfilling roles is typical of a large enterprise however not all users in a large enterprise represent the same levels of specialization. Even in the largest of enterprises, there are many small, ad hoc, multi-role/single user use-cases that exist and sometimes even flourish. This is the core characteristic of the consumerization of IT by the front office.
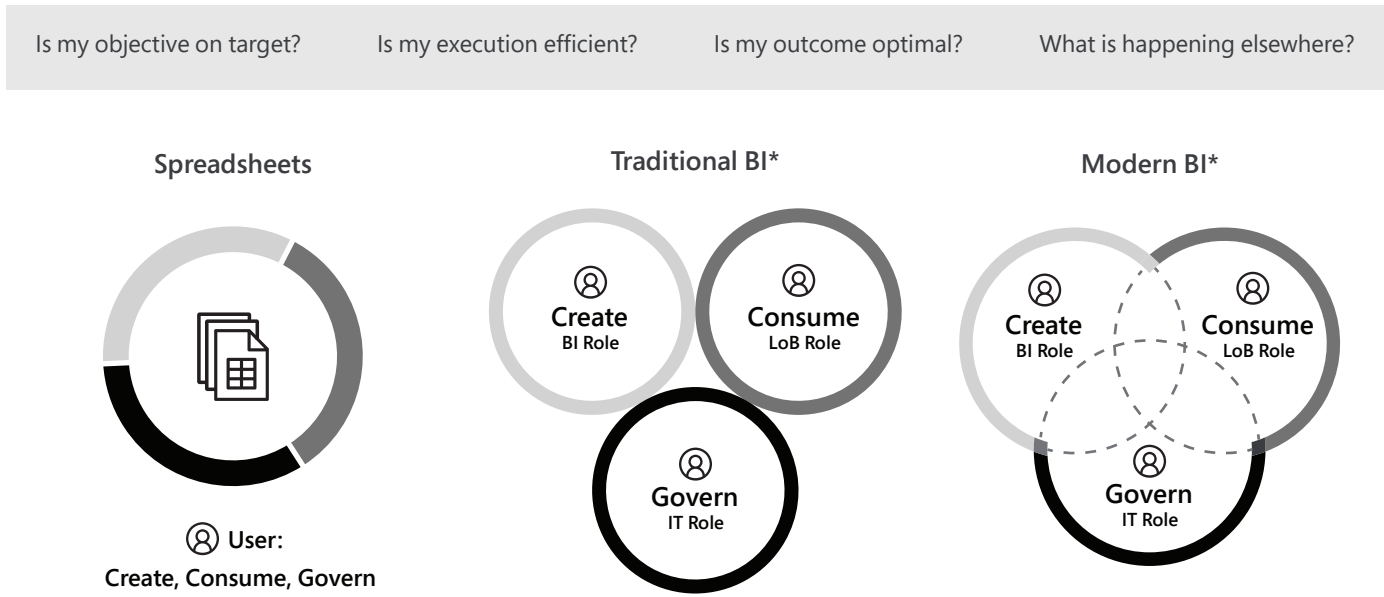
Facets of business intelligence (BI)

Shown in Figure 6 are the are the four facets of business intelligence that are employed across the business world today. The reason for these facets is sometimes historical and also associated with the evolution of business intelligence commensurate to the type of business process flows and frequencies in Figure 1.

Spreadsheets (aka Original BI)

Spreadsheets are used by individuals to perform data analysis on rows and columns of moderately sized, relatively clean, data. Spreadsheets have evolved to often be used for more than data analysis, such as generating insights delivered as reports and graphs from multiple self-contained data sources. Spreadsheets are still very widespread today and will still be used in virtually every business doing an evaluation. Here the user becomes the expert in a kind of "tribal knowledge" where the analysis and reporting are largely embodied in the mind of the author of the spreadsheet.

Four BI facets in a modern Enterprise

| Is my objective on target? | Is my execution efficient? | Is my outcome optimal? | What is happening elsewhere? |

Spreadsheets

Traditional BI*

Modern BI*

Create
BI Role

Consume
LoB Role

Govern
IT Role

Create
BI Role

Consume
LoB Role

Govern
IT Role

User:
Create, Consume, Govern

*Emerging BI (AI/ML based) is a technology evolution for the Traditional and Modern BI roles

Figure 6: Facets of BI - Spreadsheets, Traditional, Modern, Emerging

Traditional BI (aka Legacy BI)

Traditional BI formalizes and separates the roles of Create, Consume and Govern to expand the data sources and size of data well beyond spreadsheets while simultaneously establishing structured, long lived reports and dashboards conveying insights that are based on formally understood, and relatively slow-moving requirements. Here the data speaks to the user through pre-defined, structured visualization established by others who are trying to deliver their best interpretation of what the user seems to want. If the user cannot define their requirements with precision (which is often the case) then the results are often missing the most important target and insights.

Modern BI (aka Visual BI aka Self-Serve BI)

Modern BI focuses on blending the ad hoc nature of spreadsheet analysis with a rich library of visual discovery tools and an expansive set of data connectors that allow for multiple data sets to be used in the formation of insights. Here the data speaks to the user primarily through visualization.

Emerging BI (aka Artificial Intelligence (AI) /Machine Learning (ML) based BI)

AI/ML BI is twofold: AI based BI focuses on the analysis of unstructured data (text, images, etc.) while ML based BI focuses on the application of automated or semi-automated learning algorithms

on structured data. Here, the data speaks to the user primarily through scientific language. Today, Emerging BI aligns almost entirely with Traditional BI from the vantage point of the separation of roles for both formalism and skill specialization. The trend, however, is to also embed Emerging BI capabilities into Modern BI platforms where it is viable to then blend the roles so that LoB users can begin to train and exploit well defined AI/ML capabilities into their workflows.

Mapping BI platforms to business process types

While there is no firm mapping of the BI platform facets to the business process types, shown below is an example mapping of the four BI facets to the corresponding core business process types from Figure 1. Recall that, generally, complete end-to-end business processes are often composed from combinations of the seven core business process types. This means that often a combination of BI platforms from the four BI facets are required to provide intelligence feedback into the business processes of interest. This is not a strict mapping and, ideally, a BI platform can be used to span more of these seven types of business processes, which would further the simplification of BI platform consumption.
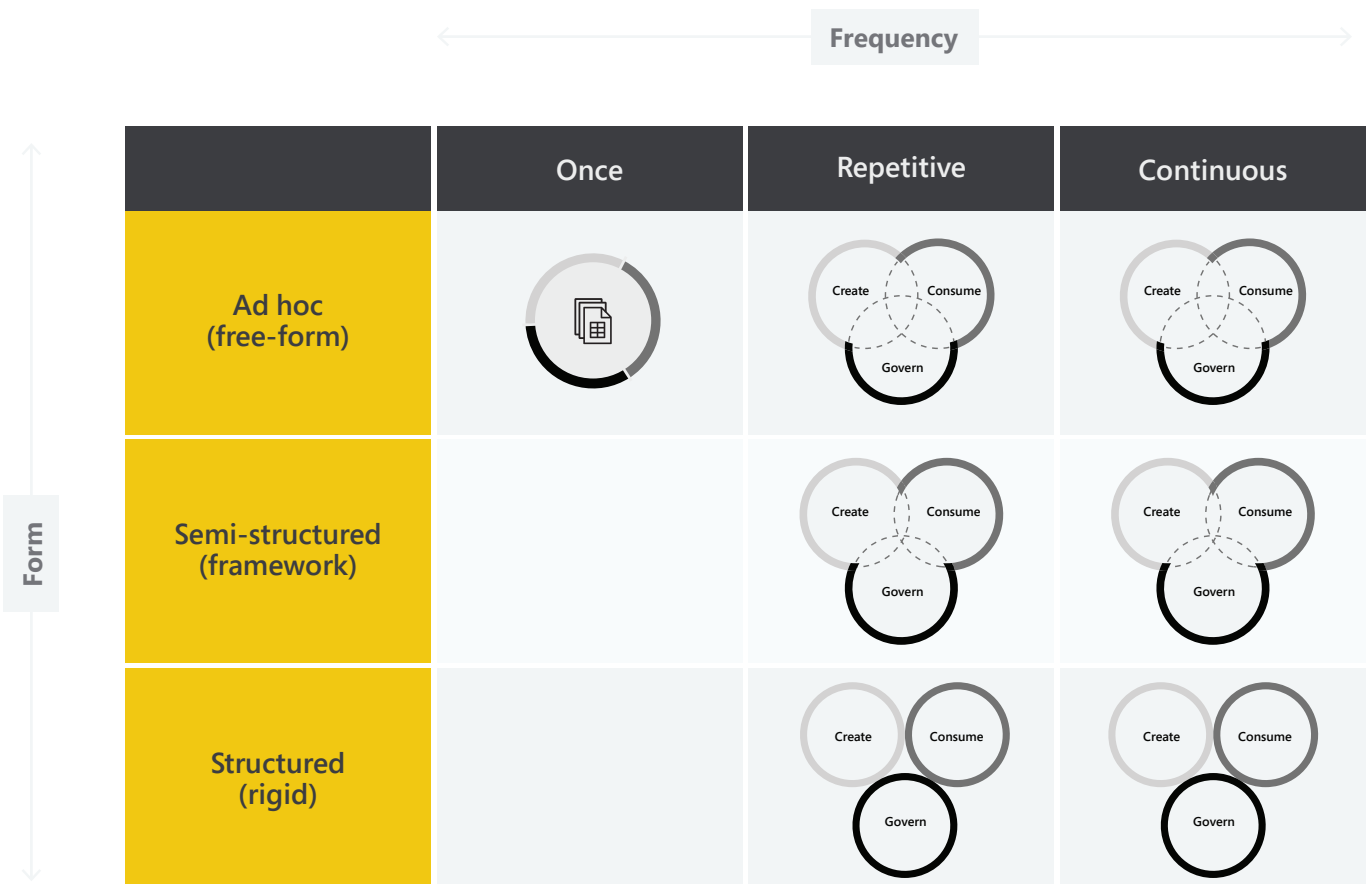

Figure 7: Mapping BI facets to Business Process Types

Business context summary

In order to get the most from an evaluation, it is important to consider which core business process types make up the overall business processes to be augmented with intelligence, both now and in the future. Then, given that contextual understanding of those needs, consider which of the BI evaluation questions outlined below are most important to help selection of a family of BI platforms to meet those needs.

Generally, care should be taken to find the minimum number of BI platforms used to address the overall needs outlined across the seven business process types as the introduction of each new platform, from potentially a different vendor, can result in further complexity for all users across all roles. While not compromising the coverage of business processes, an overall objective should be the minimization of both vendors and BI platforms, with the ideal outcome being the selection of one vendor and one BI platform to cover all needs.

03 /

Business intelligence evaluation criteria

The remaining scope of this document is associated with performing BI evaluations against the business context. Each of the evaluation criteria are formulated in a simple yes/no question, however, when using the evaluation guide it may be beneficial to further refine the quantification of the evaluation into a weighted assessment for each question based on a clear understanding of the business context and corresponding business process types outlined earlier.

Baseline the environment

The evaluator should gather some background on their collection of business processes that require intelligence according to the seven different business process types shown in Figure 1. Then assess this baseline background against the Functional and Non-Functional criteria each outlined below. Regardless of the starting point, both Functional and Non-Functional criteria are paramount to success.

Modern BI functional criteria

Unified Self-Service

An ideal BI platform will cover the entire expanse of all seven business process types. A truly modern (self-serve) BI platform should have considered these seven business process types and established itself as covering as much of that space as practical, balancing simplicity with configurability. Specifically, the modern BI platform must provide an overall user governance model that allows for controlled blending of the BI workflow actions of Create, Consume and Govern across Users/Roles to satisfy as many of the business process types as needed for all the business workflow contexts of interest.

If a business workflow context of interest does not warrant the self-serve, ad-hoc nature of a modern BI system solution, but the business workflow context is more in need of a traditional BI system solution, then the overall mapping of users to BI workflow action governance should limit the amount of self-serve capability that is enabled. Conversely, if the business workflow context demands a high velocity, ad-hoc modern BI system solution, then the overall role governance for those business workflow processes should allow for maximal self-serve employment of the Create, Consume, and Govern BI workflow actions.
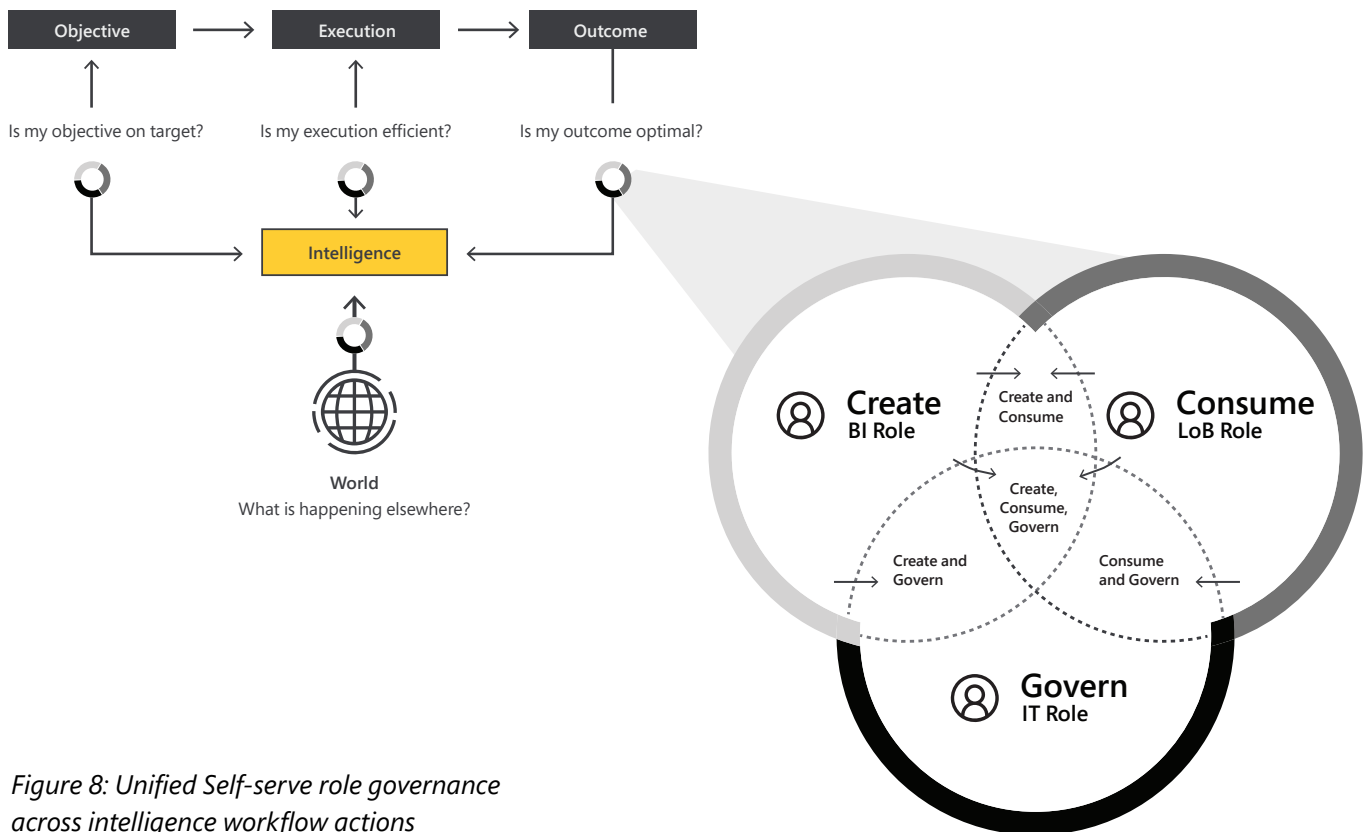

Figure 8: Unified Self-serve role governance across intelligence workflow actions

To begin understanding the value of an overall unified (controlled) self-service approach, the evaluation should explicitly look at the governance between the pure roles and intelligence workflow actions as shown in Figure 8.

	Governing unified self service
Those who Create can Consume (but not Govern)	During the creation of reports and dashboards, can those users who are authorized to employ capabilities within the Create workflow action be authorized to also employ some or all of the Consume workflow action capabilities? For example, can those users who are creating a dashboard also consume the same content in the context expected by others who also consume it? (e.g. in aggregate with other dashboard elements coming from other sources).
Those who Consume can Create (but not Govern)	Can those users who are authorized to employ capabilities within the Consume workflow action be authorized to also employ some or all of the Create workflow action capabilities? For example, as a report or dashboard is Consumed, can the user who is consuming the content Create a derivative that can provide further insight into their particular needs?
Those who Create can Govern (but not Consume)	Can those users who are authorized to employ capabilities within the Create workflow action be authorized to also employ some or all of the Govern workflow action capabilities? For example, As the reports and/or dashboards are ready for sharing, can the same user, in context that is governed by cross-user governance, share them in a self-serve manner?
Those who Consume can Govern (but not Create)	Can those users who are authorized to employ capabilities within the Create workflow action be authorized to also employ some or all of the Govern workflow action capabilities? For example, Does the BI platform support sharing of reports and dashboards that the Consumer found valuable, and that the Consumer decides that others need to see / benefit from them?
Those who Create, Consume, and Govern	Can those users who are authorized to employ capabilities within both the Create and Consume workflow actions be authorized to also employ some or all of the Govern workflow action capabilities? For example, does the BI platform support complete sharing of all capabilities as would be expected for a single user, small deployment in a startup?

BI workflow action: Create

In order to get the most of out of the BI platform, it is important to try and cover as much of the form/frequency of business process types as possible. Evaluation criteria for BI workflow actions associated with creation of business intelligence includes:

	Evaluation questions
Sourcing data	Does the BI platform require a developer to source data?
	Does the BI platform support both structured and unstructured data sources?
	Does the BI platform support analytics on streaming data sources?
	Does the BI platform require another 3rd party or is the BI platform self-sufficient for data preparation?
	Does the BI platform support federated data sources across multiple enterprises?
	Does the BI platform allow the user to connect to a variety of data sources that are known to be of varying veracity and retain indication of the veracity as a part of the metadata?
	Does the BI platform support both in memory and remote data sources?
	Does the BI platform support sourcing data from web content?
	Does the BI Platform allow users to both browse and search all data sources available for analysis?
	Does the BI Platform allow users to inspect the data source to see its certification and approval levels?
Shaping data	Does the BI platform support in-memory, columnar data sets for rapid prototyping?
	Does the BI platform provide the ability to create analysis expressions that can operate on various data sources?
	Does the BI platform provide statistics about use/non-use of data sources?
	Does the BI platform gracefully handle errors in field level data?
	Does the BI platform support data cube analysis?
Modeling data	Does the BI platform automatically detect relationships amongst candidate data of interest?
	Does the BI platform provide a way to expose redundant or inconsistent meta-data on the same data sources?
	Does the BI platform provide a set of default schemas that can be used for data integration? Can it be extended if desired?
Reports	Does the BI platform have a fixed set of visualizations or can the set of visualizations be extended?
	Does the BI platform support visualizations automatically updating themselves as the underlying data source changes?
	Does the BI platform automatically find trends in data for potential use?

Reports (cont'd)	Does the BI platform allow a visualization to be put into a report to be created from a natural language query?
	Does the BI platform allow for the duplication of a report in order to accelerate the start of a new report?
	Does the BI platform automatically create return navigation to support return navigation on a drill down into a field?
Filters and highlights	Does the BI platform allow the user to show which filters are in use, but limit the ability to modify them for certain users?
	Does the BI platform allow the user to hide filters that are in use for a given report?
	Does the BI platform allow the user to highlight certain data while leaving the remaining data visible but dimmed?
	Does the BI platform support automatically highlighting other visuals that are linked to a highlighted field?
	Does the BI platform allow filters and highlights to work on both all data sources?
	Does the BI platform allow filters to be scoped to subsets of a report?
Dashboards	Does the BI platform support composing a dashboard from live reports so that all updates to the report are reflected in the dashboard?
	Does the BI platform provide the ability for those that are Creating to also get insight into performance issue and suggestions on how to correct them?
	Does the BI platform allow the creation of a visual element from other external services such as a previously established data reporting service or a spreadsheet?
Embedding	Does the BI platform support the embedding of reports and dashboards into other business applications for users within the company?
	Does the BI platform support embedding reports and dashboards into applications outside of the company for those users who do not have any entitlement to the BI platform?
Industry verticals	Does the BI platform provide after-market, installable, templates for common industry solution patterns as a jump start? Example templates could be for:
	• Retail • Financial • Human Resources • Marketing • Merchandising • Others

BI workflow action: Consume

For modern BI, the two fundamental artifacts for consumption are reports and dashboards across all BI facets. Evaluation criteria for BI workflow actions associated with consumption of business intelligence includes:

	Evaluation questions
Reports viewing	Does the BI platform allow for searching across all (accessible) reports to find potential business insights?
	Does the BI platform allow snapshots of a report to be downloaded for offline viewing?
	Does the BI platform allow reports to be scheduled for delivery via email?
	Does the BI platform allow for drilling down into content including the viewing of corresponding meta data (as permitted by access control)?
	Does the BI platform allow for the consumer to subset data within a report?
	Does the BI platform allow for sub-setting the data used in the report based on content triggers within the report itself? (e.g. exclude a zip code).
	Does the BI platform allow someone (with appropriate access rights) who is consuming a report to customize the content for their particular use?
	Does the BI platform allow someone to seamlessly pivot into the role of creating new, derivative reports based on the reports being consumed?
	Does the BI platform allow consumers to quickly determine the veracity of the report? (e.g. certification, workflow approvals, etc.)
	Does the BI platform allow for drilling down into content including the viewing of corresponding meta data (as permitted by access control)?
Reports Printing	Does the BI platform allow for printing an entire report?
	Does the BI platform allow for printing just a selectable subset of a report?
Dashboards viewing	Does the BI platform allow for the consumer to subset data within a dashboard?
	Does the BI platform support traversing the entire collection of artifacts that contribute to a dashboard?
	Does the BI platform allow for searching across all (accessible) dashboards to find potential business insights?
	Does the BI platform support natural language interaction?
	Does the BI platform allow someone consuming a dashboard to drill into the content background?
	Does the BI platform allow someone consuming a dashboard to customize the content for their particular use?
	Does the BI platform allow someone to seamlessly pivot into the role of creating new, derivative dashboards based on the dashboard being consumed?
	Does the BI platform all the Consumer to quickly determine the veracity of the dashboard? (e.g. certification, workflow approvals, etc.)
	Does the BI platform allow the user to interactively correct data issues during the consumption of a dashboard?
	Does the BI platform allow for natural language traversal and discovery?

BI workflow action: Govern

Evaluation criteria for BI workflow actions associated with governing the business intelligence includes:

	Evaluation questions
Container	Does the BI platform provide an overall container model to house reports, dashboards, data files, queries, and other artifacts that are intended to be treated as a unit of management for subsequent evolution, consumption and governance?
	Does the BI platform container have its own versioning model that is automatically updated and reflective of the underlying version change for any artifact contained in it?
	Does the BI platform allow the container to be cloned?
Data	Does the BI platform cause the Govern role to be used to only deploy subsets of new experimental data sources to keep user performance acceptable?
	Can data refresh schedules be set up independently for each data source?
	Can on premise data be remotely accessed by an as-a-service deployment?
Queries	Can queries be redistributed to run locally at remote data sources and only return results rather than all data elements?
Report	Can the topology of all downstream derivative work from a given report be observed?
	Can the topology of all upstream incremental contributors for a given report be observed?
Dashboard	Can the topology of all downstream derivative work from a given dashboard be observed?
	Can the topology of all upstream incremental contributors for a given dashboard be observed?
Collaborative Sharing	Can the BI platform reports be exported and subsequently shared "by copy" with linkage back to the "by reference" version?
	Does the BI platform allow for content to be shared outside the firewall of the hosting enterprise?
	Does the BI platform allow for "real-time" discussion and refinement of content?
	Does the BI platform support content being annotated and commented upon and are those annotations and comments persisted, with history, along with the content?
	Does the BI platform allow users to sequence a series of content, along with commentary, to form a presentation flow for broader sharing?

Collaborative Events	Can use of a data source be tracked and reported to a set of users?
	Can that usage be queried as a history of use?
	Can use of reports be tracked and reported to a set of users?
	Can use of dashboards (including duration of usage) be tracked and reported to a set of users without 3rd party customization?
	Does the BI platform emit events that represent user navigation actions? (e.g. close a dashboard, click into a field, etc.)
Collaborative Alerts	Does the BI platform allow alerts to be established for dashboard elements?
	Does the BI platform provide non-distracting alerts, in context, for the BI workflow user interface?
	Does the BI platform allow an unlimited number of alerts to be set for both data and content changes?
	Does the BI platform allow alerts to optionally trigger one-shot or repetitive notifications?
	Does the BI platform allow for algorithmic alert thresholds to be defined? Does the BI platform allow users to subscribe to alerts that indicate updates in data and/or content?
	Does the BI platform pass along user defined metadata about the alert that can be used either in notifications or programmatically in an SDK?
	Does the BI platform allow alerts to be used as triggers for other automation?
Collaborative Notifications	Does the BI platform provide a central focus area to see all notifications and their history?
	Does the BI platform allow the user to drill into why the notification was received?
	Can a set of users be notified on data refresh success/failure?
	Does the BI platform allow for algorithmic or static triggers for notifications to a set of users?
	Does the BI platform allow for notifications to be configured for differing channels? (e.g. email, SMS, Social, etc.)
	Does the BI platform allow for users to subscribe to Notifications including selection of channels and notification threshold levels?
User/role access control	Does the BI platform provide usage and group metrics?
	Does the BI platform provide audit logs?
	Does the BI platform integrate with, or optionally use, a common directory system?
	Does the BI platform allow for row level security for in-memory data?
	Does the BI platform allow for row level security for remotely connected data?
	Does the BI platform allow users to self-register into the enterprise multi-user platform?
	Does the BI platform have the ability to import a batch list of users for a large enterprise?
	Does the BI platform allow for merging instances of the platform as might be the case with an acquisition or merger?

Content lifecycle and versioning	Does the BI platform provide a way to become aware of all downstream derivative work?
	Does the BI platform provide well defined veracity marks for various levels of content veracity? (e.g. watermarks)
Data lifecycle and versioning	Does the BI platform allow an authorized user to promote or constrict the access control to a given data source?
	Does the BI platform provide well defined veracity marks for various levels of data veracity? (e.g. watermarks)
	Does the BI platform allow extensions to a data model to be versioned such that downstream content that consumes a previous version of the data model will not be inadvertently broken while the new data model will be available for subsequent analysis?
	Does the BI platform provide a way to become aware of all downstream dependencies on a given data source?
	Does the BI platform provide a way for content to be rolled back to previous versions?
	Does the BI platform provide a way for data sources to be rolled back to previous versions?
	Does the BI platform support seamless replacement of a data source with a newer version for all downstream consumers?
	Does the BI platform offer a way to easily find duplicate data sources as well as provide assistance to normalize those duplicates with limited or no disruption to downstream dependencies?
Performance	How does the performance compare between Live Connections and In Memory copies? What are the limitations of both?
	Does the BI platform provide the capability to triage performance issues and provide suggestions on how to improve performance based on usage patterns in both the Create and Consume roles?
	Does the BI platform provide the triage of performance issues by user as well as by role or by content?
	Does the BI platform provide a sandboxing type environment to assess performance impact prior to data or content publication?
	Does the BI platform provide options to either scale up or scale out for the on-premise deployment?
	Does the BI platform provide profiling tools to help identify bottlenecks?
Programmatic administration	Does the BI platform support scripting of common tasks?
	Does the BI platform support other forms of programmatic administration via SDK?

BI facet affinity ("inherently familiar")

As outlined earlier, almost all enterprises will have more than one BI facet being used across the company to cover the expanse of business processes composed of combinations of the seven business process types. For roles that use multiple platforms to cover these facets across the company, there may be value in having an experience that is inherently familiar between the platforms. Does the modern BI platform deliver an inherently familiar experience to:

	Evaluation questions
Spreadsheet affinity	If there are spreadsheet platforms already employed in the environment for generating reports, can the reports from those spreadsheets be incorporated into the reports from the modern BI platform?
Traditional BI affinity	If there are traditional BI platforms already employed in the environment, can the reports from those platforms be incorporated into the reporting experience of the modern BI platform? Does the vocabulary used in the modern BI platform accommodate the vocabulary that is used in the traditional BI platforms?
Emerging BI affinity	If there are emerging (AI/ML) based BI reports already employed in the environment, can those reports be integrated into the reporting of the modern BI platform? Does the vocabulary used in the modern BI platform accommodate the vocabulary that is used in the emerging BI platforms?

Modern BI non-functional criteria

These criteria capture all the surrounding requirements that must be considered to maximize success of the use of a modern BI platform across all business process types. The non-functional requirements for the modern BI platform include the following:

Implementation criteria
This section helps assure that there is are choices on deployment options, as well as sufficient training, support, and implementation of governance.

	Evaluation questions
Training	Does the BI platform have online video training for common usage patterns?
	Does the BI platform have self-paced tutorials for common usage patterns?
	Is the training specific to the roles of Create, Consume, and Govern?
	Does the training describe how to pivot between Create and Consume roles within the allowed freedom defined by the role of Govern?
Support	Does the BI platform have easy to search self-directed and curated help for common, product specific, questions?
	Does the BI platform have a help desk solution that meets overall needs?
	Is the help desk solution "inherently familiar" with other help desk solutions deployed in the business?
	Is there an active, on line, user community that allows the sharing of best practices?
	Does the BI platform provider have a documented history of success in resolving problems?
Deployment/ delivery options	Does the BI platform support on-premise deployment?
	Does the BI platform support a hosted, single tenant, deployment?
	Does the BI platform support a multi-tenant, as-a-service, delivery?
	Does the BI platform allow for flexible choice of either in-memory or remote connect for data sources for each of the deployment / delivery options?
	Does the BI platform support customer-defined combinations of in-memory and remote connect options across deployment options?
Frequency of updates (feature rollout, patches, fixes, etc.)	Does the BI platform have a clear history of being responsive to fixing bugs across each deployment type?
	Does the BI platform have a clear history of rolling out new features on a cadence that indicates a healthy platform?
	Is there feature parity across deployment types?

Onboarding	Does the BI platform have a structured onboarding process for turnkey (self-service) use? Does the BI platform require a partner to get started or can employees of the company work directly with the BI platform team for expertise along with their community-based forums for self-help?
Success	Does the BI platform have a dedicated post-entitlement success process that is available for each level of entitlement? Does the BI platform have public, or privately shared, metrics around retention and growth of existing customers? Does the BI platform have public, or privately shared, metrics around customer sentiment? E.g. NPS scores or some equivalent? Does the BI platform have a grass roots adoption community within the company already?
Online community	Does the BI platform have a clear, current, web presence that does NOT co-mingle historic, out of date, mis-information? Does the BI platform have user groups that are self-sustaining and run by the users themselves? Does the BI platform include easy to find skills in popular employment tools?
Pricing	Is the pricing for each deployment model clear, scalable, and correlated with relevant features? Does the BI platform demonstrate advantageous cost over the entire lifecycle of its use (first year, second year, cumulative years of expected use)? Do the BI platform have deployment options that fit economic expectations today, and can adjust as needs change? Does the BI platform support a Pay-As-You-Go (PAYGO) model? (including pause, scale up, scale down, and not just a yearly contract divided into equal payments? Does the BI platform allow self-service purchasing?
Roadmap	Does the BI platform have a published, or privately shared, roadmap?
SaaS Security/ regulatory compliance	Does the BI platform support all the security and regulatory compliance requirements required by the company? Examples: FedRAMP, HIPAA, ISO 27001/27002 certification for as-a-Service, GDPR, etc.
SaaS Availability	Does the BI platform, when delivered as-a-Service, offer an availability promise that meets the company's needs?
SaaS Scalability	Does the BI platform have a limitation on total number of users? Does the BI platform have a limitation on number of data sources? Does the BI platform have a limitation on the size of any given data source, either in memory or remote connect?

SaaS Elasticity	Does the BI platform have a limitation on total number of users?
	Does the BI platform have a limitation on number of data sources?
	Does the BI platform have a limitation on the size of any given data source, either in memory or remote connect?
SaaS HA / DR approaches	Does the BI platform, in each deployment option (on premise, hosted, multi-tenant), allow for scaling both up and down as use changes? If so, how much notice is required for the system to respond? Does the elasticity get reflected in the billing for as-a-service deployment?
SaaS Archiving	Does the BI platform have a published HA strategy that can be implemented by the skills on board?
	Does the BI platform have a published DR strategy that can be implemented by the skills on board?
SaaS Retention	Does the BI platform offer an archiving capability for the content and/or data?

Integration criteria

This section helps assure that the resulting business intelligence can be used to impact the business context in areas such as access control integration, development tools, partner eco-system, embedding, public cloud affinity, IoT support, and common tools integration.

	Evaluation questions
Architecture scope	Does the BI platform provide sufficient capability for Create, Consume, and Govern on its own, or does it require additional products to be entitled to deliver its stated capabilities?
Access control	Does the BI platform clearly define roles and capabilities that are potentially assigned for each user?
	Does the BI platform provide fine grained control of users and/or groups of users for each data source?
	Does the BI platform provide fine grained control of users and/or groups of users for each content element (reports and dashboards)?
	Does the BI platform allow fine grained control of specific data fields or data rows in a data source for different users and/or groups?
	Does the BI platform support deployment-wide reporting on usage / access?
	Does the BI platform allow for integration with existing content management systems and, therefore, become "inherently familiar" to those users?
	Does the BI platform propagate access control changes to all downstream users automatically and immediately?
	Does the BI platform allow content to be shared with external users?

Identity	Does the BI platform support federated login with 3rd parties?
	Does the BI platform support federated login with other IT capabilities in the business processes within and across the company?
Dev tools/ programming model	Does the BI platform have a proven track record of preserving its "surface area" (aka all of the UX, Configuration, Customization, and Extension Interfaces) over time?
	Does the BI platform support being augmented with custom analytics capability via API and/or SDK?
	Does the BI platform allow automated workflow to be created/integrated via API?
Partners	Does the BI platform have a widespread partner eco-system, who have relevant references, to help with reporting and dashboards?
	Does the BI platform have an ecosystem of services that can have readily available skills to help augment the customer team around configuration and deployment?
Embeddable	Is the BI Platform embeddable into an alternative user interface?
	Does the BI platform support integration with "digital workers" (e.g. automation integration)?
	Does the BI platform have a structured onboarding process for embedded use?
	Does the BI platform enable the use of the same security model as required for the encompassing solution when embedded?
	Does the BI platform support the integration of dashboards into the UX shell of the business workflow processes?
Microsoft Office 365	Does the BI platform provide integrated identity to Microsoft Office 365?
	Does the BI platform provide an "inherently familiar" navigation, sharing, and menu system with Microsoft Office 365?
	Does the BI platform allow reports to be exported as PowerPoint presentations?
Other productivity suites	Is the BI Platform enabled for the company's office productivity suite (assuming it is not Microsoft Office 365)?
	Does the BI platform allow reports to be exported as other presentation formats besides PowerPoint?
Public cloud (aka hyper-scalers)	Is the BI platform enabled for out of the box accelerators with one or more public cloud platforms?

Mobile form factor coverage/ management	Does the BI platform support all of the following form factors? • Desktop (installed/web) • Tablet (app) • Tabled (web) • Smartphone (app) • Smartphone (web) • Cell phone (sms) Does the BI platform allow content to be Consumed across all of the common form factors listed above? Does the BI platform allow content to be Created across all of the common form factors listed above? Does the BI platform allow the data and content to be Governed across all of the common form factors listed above?
Mobile Create	Does the BI platform support cached content for offline interaction? Does the BI platform support WYSIWYG editing for reports on various form factors?
Mobile Consume	Does the BI platform render all UI with context awareness? Does the BI platform provide the ability to annotate and share content from and with all mobile form factors?
Mobile Govern	Does the BI platform support the execution of governance actions on mobile form factors? Does the BI platform provide capability to require mobile password entry prior to access to any content? (to mitigate the risk of lost devices)
IoT support	Does the BI platform support IoT integration? (scale, topology, sporadic connectivity, etc.)?

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Summary

This document provides assistance in the evaluation of modern, sometimes known as self-serve, business intelligence (BI) platforms. BI solutions have no value unless they help to drive the success of business processes. To make an informed BI platform decision, or decisions, requires a clear understanding of the business context. To establish an understanding of the business context for the evaluation, the document defines seven different business process types differentiated by a combination of their form (ad hoc, semi-structured, structured) and their frequency of use (once, repetitive, continuous). BI platforms, then, are used to provide insights and feedback into the business context and, more specifically, become the insight and feedback workflow elements in as many of the business process types as required. This insight and feedback must be done in a manner that is consistent with both the form and the frequency for the business processes of interest.

The evaluation criteria cover both functional and non-functional requirements and are formulated as simple yes/ no questions. These questions can be enhanced by the reader into a weighted assessment for each question based on a clear understanding of the business context and corresponding business process types outlined earlier.

When defining the overall business context for any enterprise, both now and in the future, it is expected that the full complement of all seven business process types across the form and frequency spectrum must be considered.

Rather than a proliferation of point solutions for the various business process types, an overall objective should be the minimization of vendors and BI platforms while simultaneously not compromising the coverage of business processes.

About Microsoft Power BI

Microsoft Power BI is the unified self-service and enterprise-grade business analytics platform designed to help any organization build a data-driven culture. Connect your data and intelligently transform it into globally accessible data visualizations. Empower everyone to access the insights and answers they need to make informed decisions quickly and confidently.

- Unify self-service and enterprise analytics

- Unlock answers fast with AI-assisted data preparation and exploration

- Empower everyone to make data-driven decisions with confidence

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