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Comparing TCO for Business Intelligence Solutions:

How to Calculate Costs for Competitive Options

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Introduction

Cost should not be the primary consideration when it comes to a decision as important as choosing a business intelligence (BI) solution, but it does in fact matter to any well-run organization. It is challenging to compare total cost of ownership (TCO) across different solutions—especially with the proliferation of TCO analyses skewed to favor particular vendor offerings, and the reality that providers can offer discounting and other special pricing that can alter TCO on a deal-by-deal basis. What is certain, however, is that the case for BI and cloud BI solutions is clear—and that buying decisions can benefit from a no-nonsense approach to cost calculation that makes comparison of options easy to understand, and that satisfies stakeholders across the organization.

As a part of its ongoing assessment of the markets in which it competes, Microsoft asked Frost & Sullivan—a major, global industry analyst and consulting firm—to provide an assessment of the Total Cost of Ownership (TCO) for BI. The assessment included Power BI and available alternatives based on the best objective methodology: one that depends on Generally Accepted Accounting Principles (GAAP), and that depends on quantifying the costs associated with acquiring and maintaining a technology.

Key findings include the conclusion that Power BI is always the lowest cost solution for BI implementations, as well as the finding that BI implementation costs scale with the number and type of licenses that one must obtain. Frost & Sullivan also found that non-TCO considerations often influence the selection of a particular BI solution; these include considerations such as the familiarity with the tool conventions, as it affects training requirements; and the condition of the data that will be utilized in reporting.

After conducting market research and building a comprehensive TCO model, Frost concluded that Power BI offers the lowest TCO of the 3 tools under comparison, while satisfying many of the most pressing non-cost considerations.

Methodology

Although many have attempted to assess BI tool implementations strictly on subjective assessments of tool use and reporting requirements, when justifying a new investment or expenditure, most companies depend on cost accounting to compare alternative technologies. In considering approaches to calculate TCO, and examining those used previously, Frost & Sullivan concluded that the best way to analyze costs is to base the calculation on industry standard principles.

Generally Accepted Accounting Principles (GAAP) are administered by the American Institute of Certified Public Accountants (AICPA) and the Financial Accounting Standards Board (FASB), and are the definitive source of accounting guidelines companies rely on when preparing financial statements. GAAP rules and procedures govern corporate accountants when they present the details of a company's financial operations. Figure 1 lays out some of the key principles of GAAP with implications on this or any TCO analysis.

Figure 1: Key Principles of GAAP

Principle	Description / Implications
Objectivity and Prudence	The company financial statements provided by the accountants should: • Emphasize fact-based financial data representation not clouded by speculation • Be based on objective evidence
Periodicity	• Entries should be distributed across the appropriate periods of time • Example: revenue should be divided by its relevant periods
Materiality	The significance of an item should be considered when it is reported; an item is considered significant when it would affect the decision of a reasonable individual
Consistency, and Permanence of Methods	Accounting professionals must commit to: • Apply the same standards throughout the reporting process to prevent errors or discrepancies • Fully disclose and explain the reasons behind any changed or updated standards
Good Faith	Accountants must strive for full disclosure in financial reports

Sources: Frost & Sullivan, AICPA, and FASB

TCO as defined under GAAP is straightforward and well understood: it includes the cost of implementing a product or service plus the carrying costs associated with that product or service over time. For purposes of performing TCO analysis of BI solutions, core cost components are broken out as follows:

- Cost of implementation = the asset purchase price + the cost to install and test
- Carrying costs = the cost to train employees + the cost to maintain the asset + the cost to update the asset over time

Simply put, the core component of BI TCO is the number and type of users, because this is what drives the most significant costs: licensing and training.

To account for total cost over time, Frost & Sullivan chose a three-year term, which is a typical depreciation period for IT equipment; the average lifespan of many software tools; and an appropriate forward-looking period to inform business decision making. Thus, to analyze TCO, we analyzed the total cost of owning (or licensing) and operating software and/or hardware over a three-year period.

Calculator Operations

Based on the above considerations, Frost & Sullivan built a TCO calculator that compared several BI implementation options available to a potential decision maker: an On-Premises solution using a commonly available BI tool; a commonly available tool used in a SaaS environment; and Power BI. These options were coded in such a way as to always select for the most cost-effective option. Where a lower cost pricing model was available, it was used.

For example, Power BI offers a free Power BI Desktop tool and licensing options that include per-user pricing with Power BI Pro; and a capacity-based wraparound model, Power BI Premium, as

shown in the company's Power BI Premium Calculator.[1] As shown there, this strategy supports three user types: Pro users, Frequent Users, and Occasional users. Other competitive offerings in the marketplace similarly address a three-tier user strategy—but whereas some of those restrict authoring (content creation) only to the highest level of users, Power BI allows content creation by all—and that is a key differentiator. In each scenario for each competitive offering, Frost & Sullivan's TCO Calculator defaults to the most cost-efficient licensing choice. Power BI pricing breaks out as follows:

- Power BI Desktop – a free authoring tool
- Power BI Pro – a SaaS service that enables sharing and collaboration, and costs $9.99 per month
- Power BI Premium – a dedicated capacity offering in the cloud to extend access to BI to large groups of users that need to consume content created by others

To compute TCO for Power BI, the Calculator asks the decision maker to specify the number of authors and casual users; then, determines the appropriate licensing approach by selecting the least cost option as noted above.

To compute TCO for Alternative On-Premises solutions, the Calculator uses the publicly posted pricing from a primary Microsoft competitor in the BI space. Without the benefit of either the cost-savings of cloud computing and storage, or pricing strategies such as Microsoft's Power BI Premium offer, Alternative On-Premises solutions are always the most expensive BI solutions.

To compute TCO for Alternative SaaS, once again, the Calculator uses the publicly posted pricing from a primary Microsoft competitor in the BI space. Also, if the user population mix is such that a basic desktop license is less expensive, the Calculator chooses the lower cost. Alternative SaaS solutions offer the cost advantages of the cloud but not Power BI Premium's capacity-based pricing; so, these solutions fall somewhere in between Alternative On-Premises solutions and Power BI.

For the other cost factors considered in the calculator:

- Training: Based on publicly available pricing for online training, pricing used in other tools, and conversations with providers of training, the TCO Calculator applies a figure of $3,000 per user for training.
- Hardware maintenance: A small number of desktop computers will require upgrading for any solution. Growth in Alternative On-Premises server support scales directly with the number of users.

Comparing BI TCO across Four Company Size Scenarios

Armed with a TCO calculator, Frost & Sullivan then set out to assess the impact of BI implementation on several representative companies. Based on information from various sources, including the U.S. Bureau of Labor Statistics and similar agencies in other regions, Frost & Sullivan developed four company size scenarios, representative of various sized businesses using BI solutions, as shown in Figure 2.

[1] Microsoft, *Power BI Premium calculator,* available here

Figure 2: Four Company Size Scenarios for Our TCO Analysis of BI Solutions

Company Size	Headcount Range	Fixed Figure for Analysis
Small Business	1-99 employees	50
Small-to-Medium-sized Business (SMB)	100-999 employees	500
Midsized Business	1,000-9,999 employees	5,000
Enterprise	10,000+ employees	10,000

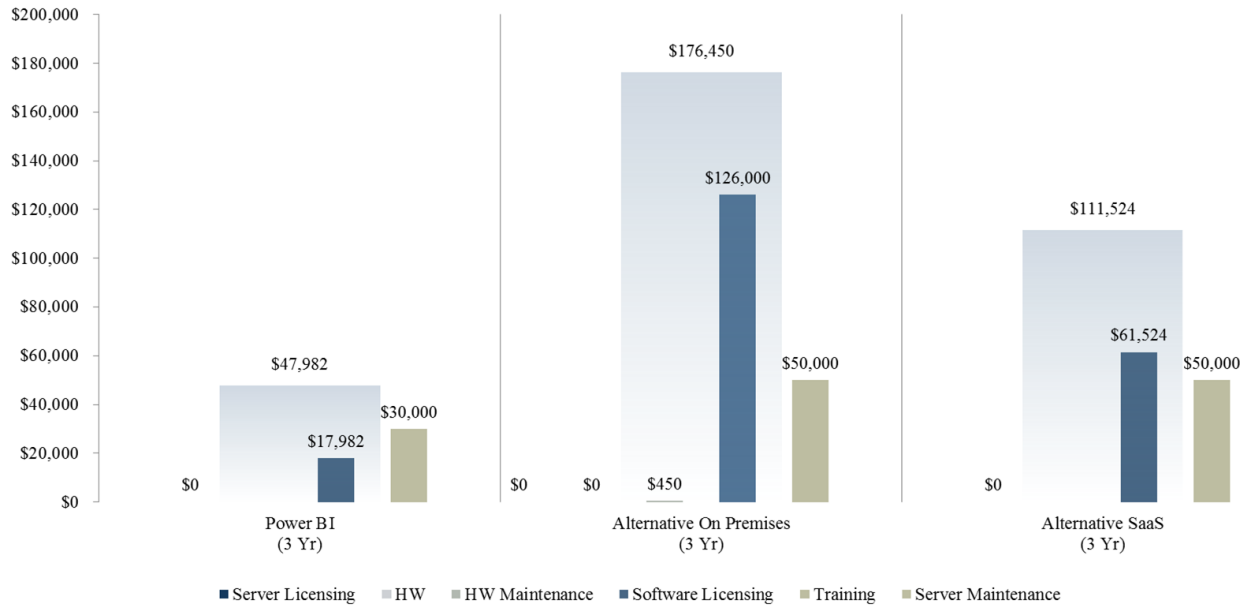
Source: Frost & Sullivan

Choosing a headcount of 10,000 or greater at the top end employs an accepted benchmark, and enables companies with greater headcounts to roughly calculate or same-size their own needs based on multiples of 10,000. The sections immediately following break out the results of our TCO analysis of competing BI solutions across the four company size scenarios identified above.

Small Business: 50 Employees

For a small business with 50 employees, the Calculator determined that the three-year TCO for competing solutions, as shown in Figure 3, is as follows: Power BI, $47,982; Alternative On-Premises, $176,450; and Alternative SaaS, $111,524.

Figure 3: BI Three-year TCO for Small Businesses



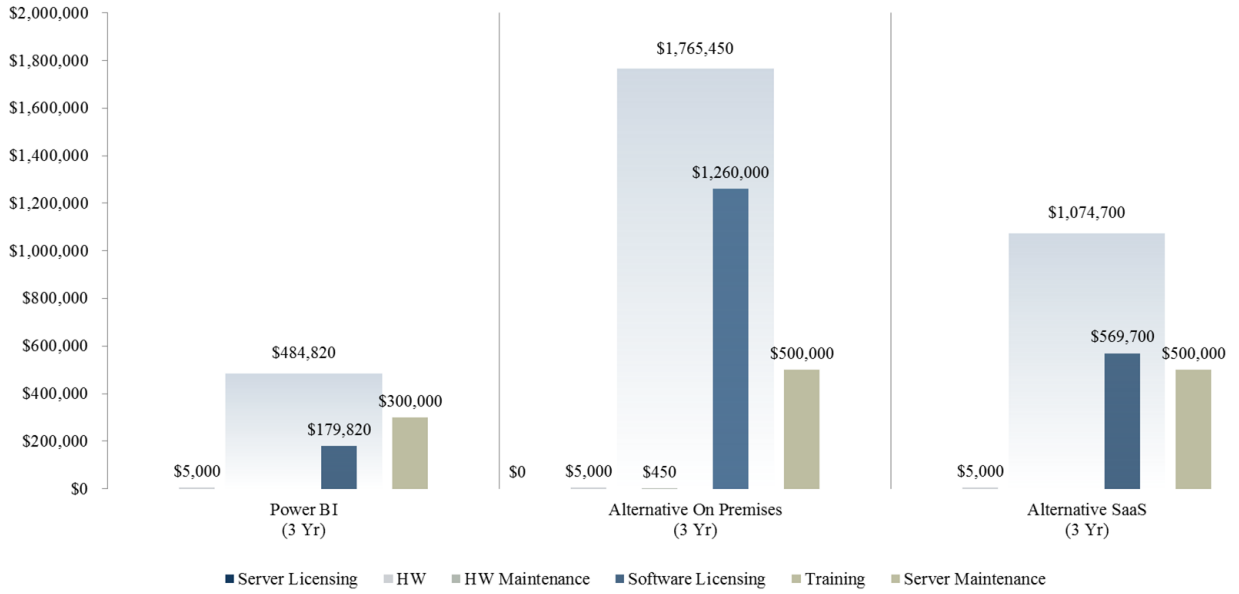
Source: Frost & Sullivan

The three-year TCO of Power BI was slightly more than one-quarter (27.19%) of Alternative On Premises and less than half (43.02%) of Alternative SaaS solutions.

Small-to-Medium-Sized Business (SMB): 500 Employees

For an SMB with 500 employees, the Calculator determined that the three-year TCO for competing solutions, as shown in Figure 4, is as follows: Power BI, $484,820; Alternative On Premises, $1,765,450; and Alternative SaaS, $1,074,700.

Figure 4: BI Three-year TCO for SMBs



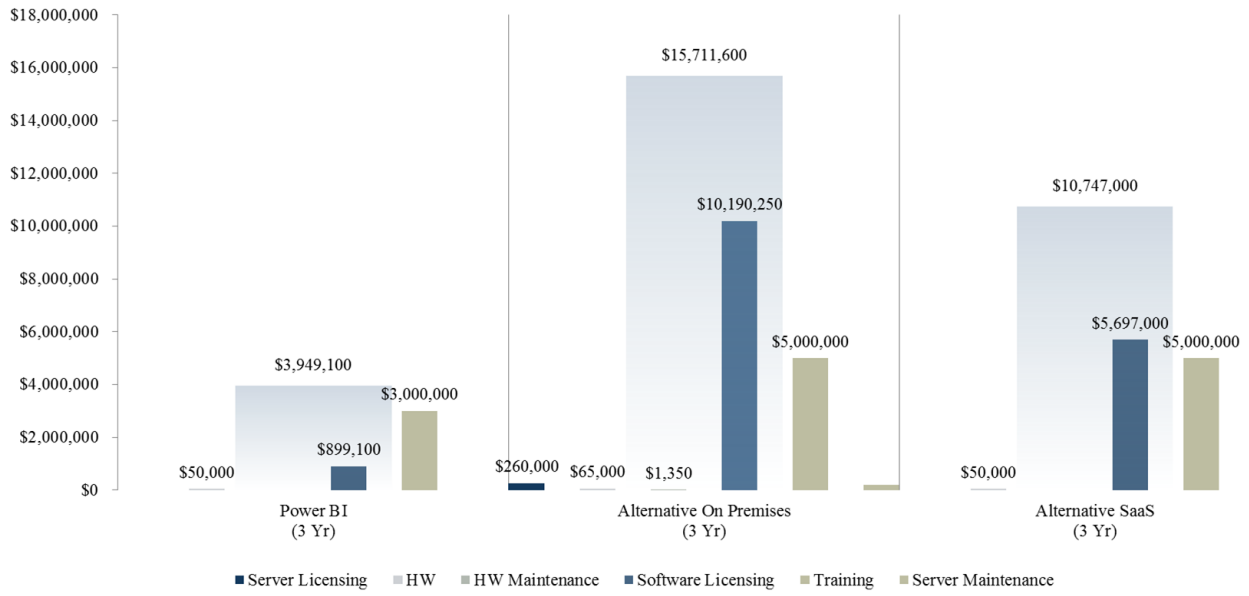
Source: Frost & Sullivan

The three-year TCO of Power BI was less than one-quarter (22.09%) of Alternative On Premises and 58.19% of Alternative SaaS solutions.

Midsized Business: 5,000 Employees

For a midsized business with 5,000 employees, the Calculator determined that the three-year TCO for competing solutions, as shown in Figure 5, is as follows: Power BI, $3,949,100; Alternative On Premises, $15,711,600; and Alternative SaaS, $10,747,000.

Figure 5: BI Three-year TCO for Midsized Businesses



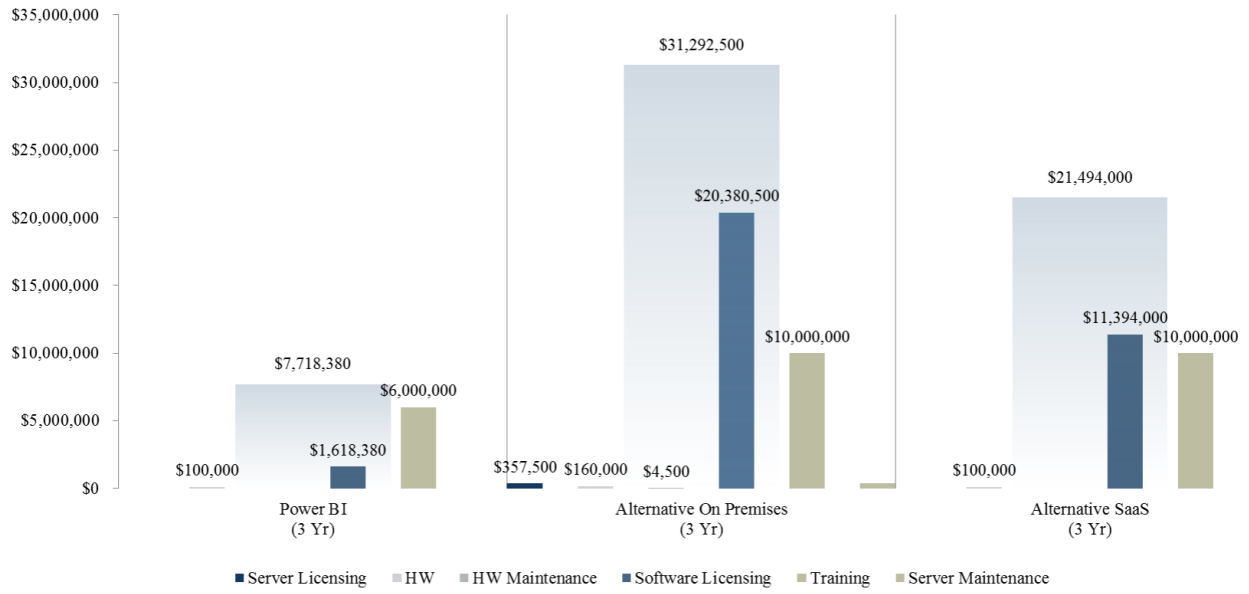
Source: Frost & Sullivan

The three-year TCO of Power BI was almost exactly one-quarter (25.14%) of Alternative On Premises, and Power BI began to pull away from Alternative SaaS, with a TCO of slightly more than one-third (36.75%) of those solutions.

Enterprise: 10,000 Employees

At the enterprise level, the power of Premium accelerated. For an enterprise with 10,000 employees, the Calculator determined that the three-year TCO for competing solutions, as shown in Figure 6, is as follows: Power BI, $7,718,380; Alternative On Premises, $31,292,500; and Alternative SaaS, $21,494,000.

Figure 6: BI Three-year TCO for Enterprises



Source: Frost & Sullivan

At this level, the three-year TCO of Power BI was less than one-fourth (24.67%) of Alternative On Premises and slightly more than one-third (35.91%) of Alternative SaaS solutions.

Key Findings

The primary finding of Frost & Sullivan's TCO analysis of BI solutions is that Microsoft Power BI is the lowest-cost solution across all company size scenarios we tested. This is primarily due to the fact that Microsoft's pricing model is more efficient when applied to a range of potential use cases: Microsoft pricing scales in a non-linear way and, at low numbers of users, shifts from a Power BI Pro pricing scheme to one that depends on Power BI Premium pricing.

This illustrates another key observation: the power of licensing is the single most important driver in TCO, since, for application software used in a cloud-served environment, licensing makes up the bulk of the company's outlay. **Power BI scales more efficiently than the tools in the competitive set because, with Power BI, the cost per user decreases substantially as more users are added to the deployment.** At lower user counts, this can be attributed to free authoring with Power BI Desktop. At higher user counts, this can be attributed to the economics of the Power BI Premium option. Interestingly, regardless of company size, Power BI is always the least cost solution, primarily due to its more efficient license pricing model.

Additional key findings include:

- On-Premises BI implementations are not recommended due to the high cost of hardware and support.
- SaaS solutions are recommended, because they are much more efficient and cost-effective. They sharply reduce cost by eliminating a broad range of costs for deployed hardware and

software (capex), plus the ongoing, on-site operating costs associated with both (opex). This makes adding new users to a deployment faster and more efficient.

- User time and usage are sunk costs under GAAP. As such, these costs (also known as past costs) are strictly excluded from future business decisions—such as the decision to deploy a given BI solution—because these costs will be the same regardless of the outcome of such a decision. They have already been incurred, and thus cannot be recovered. As a result, we did not include user time and usage in our model.
- Training costs can be a major consideration when large numbers of authors are anticipated. This is due to the high unit cost per training session. Selecting cost efficient approaches to training is an important consideration.

As can be seen, TCO based on GAAP analysis can provide substantial insights into the dynamics of BI implementation. Yet, financials can only take you so far; there are other qualitative considerations that a decision maker might also want to consider.

Transcending TCO

Other factors worthy of consideration when adopting a BI strategy that transcends TCO itself can include qualitative factors. Figure 7 illustrates some of these.

Figure 7: Factors to Consider Beyond TCO

Factor to Consider	Description / Implications
Most Important Factor: User Base Skill Levels	The most important thing to consider before deploying any BI solution across an organization is the skill of the user base. A BI solution can only add value if users can readily use the tool in a way to discover and share actionable insights.
Training Can Make or Break BI Adoption	• It may seem obvious, but since the reality is lost on quite a few BI buyers, it is worth stating here: the more training a BI solution requires, the more it will cost in the long run. Training has either a major positive or negative impact on the carrying cost component of GAAP TCO analysis. • We recommend users shop around for the best training value, perhaps working with their VAR or other third party to see if the provider will throw in training for free.
Data Preparation[2]	• Due to the volume of data and the tools they are using to deal with it, IT and data science are spending up to 80% of their time and resources on data preparation: ETL, data mashups/wrangling/blending. • If a BI solution has data preparation and other such capabilities on board, that is an advantage. If it does not, it is a disadvantage. • Costs for third-party tools to fill gaps such as this, and the additional costs to integrate those external tools with the organization's IT and big data infrastructure, add to the cost of implementation and the carrying cost associated with a BI solution.

[2] Stratecast, *BE PREPARED! A Lively Discussion on Data Preparation* (BDA 6-03, March 2018), available here

Factor to Consider	Description / Implications
BI Integration with Existing Tools, Interfaces, and Workstyles	• A critical factor in implementing a BI solution is whether users can access the solution from an already-familiar interface; and further, whether the solution integrates with an organization's existing productivity tools. • If a solution does so, it truly puts the "flow" in workflow. Conversely, if users must jump in and out of a familiar interface in order to work with a new BI tool, that hurts both existing processes and the hoped-for benefits of the new tool.
Restrictions on Authoring Limit the Benefits of BI	Companies adopt BI solutions primarily to empower users to discover and share actionable analytics insights, and thereby drive smarter, faster decision making across the organization. BI solutions that restrict authoring (content creation) to only a select group undercut this—and in so doing, undercut the primary benefit of BI.

Source: Frost & Sullivan

More broadly, the industry is at an inflection point where cost, efficiency, and streamlined operations rule, and organizations are no longer dependent on in-house capital and resources for BI and other data and IT capabilities. SaaS BI enables the organization to focus on core business objectives versus the opportunity cost of maintaining technology assets. It enhances productivity and optimizes delivery of desired capabilities, which speeds time to results.

SaaS BI enhances operational excellence by integrating with other major systems across the enterprise that, in most cases, are already in the cloud, such as CRM, ERP, accounting, HR, and marketing. Organizations avoid dropping an expensive installed system into the midst of these other solutions—and the heavy lifting associated with integrating it into the mix. In short, we believe SaaS BI is a logical decision and a natural progression, positioning a company as an agile organization.

Stratecast
The Last Word

In considering various approaches, Frost & Sullivan determined that the best way to provide objective analysis of TCO for BI solutions is to adhere to GAAP.

When assessed according to principles of GAAP, Microsoft Power BI was the lowest-cost solution across a representative set of company size scenarios from 50 to 10,000+ employees. Power BI scales more efficiently than competitive solutions because its cost per user decreases dramatically as more users come on line; because of Microsoft's aggressive pricing model; and because of Power BI's integration with and support of other Microsoft technologies that are ubiquitous with virtually every prospective Power BI user, including Microsoft Office, Excel, Excel Online, and Office 365.

Readers who wish to learn more about Power BI may do so here.

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