

CHAPTER V

RESULT & DISCUSSION

5.1 Result of Comparison

In this research, the researcher is focused on the comparison study using apple to apple data comparison. The comparison study starts with the development of Self-service BI as a decision support system. The development of SSBI will accelerate and automate data processing into meaningful information started from data integration from data sources, ETL, manage dimensions until data visualizations for self-service business users.

After all of the common steps to develop the SSBI system are resumed, the study continues to the parameter analysis. The parameter is set to help defining or classifying the system. There are several parameters that researcher used based on the professional BI user. Yet, due to the focused of the research, the researcher limits some parameter based on the specific features of SSBI Tools which are; Select data for analysis, Data blending, create measures, create hierarchies, and Save Queries and analysis.

5.2 Discussion

This research is focused on comparison study based on several parameters to help in classifying the software. Yet, the researcher is not allowed to embed one tool. It is because the researcher has to show the scientific discussion which are the advantages and the disadvantages. Then, the researcher will add some parameters as the additional features that can be compare-able as the differentiator parameters.

5.2.1 Differentiators Features

There are several features that often be the differentiators to choose the BI software. Yet, the researcher will limit the parameters to make it focus and narrow. The researcher will also add some features as comparison parameters which are the advantages of each software. These features include:

1. Create and publish by business users.

The product must enable the user to save and share his or her analysis with other BI consumers. Both of Power BI and Tableau Desktop can save and share the analysis with other users. Yet, each software has its own limitation. The figures 5.1 and 5.2 will explain each software limitation of publishing the analysis:

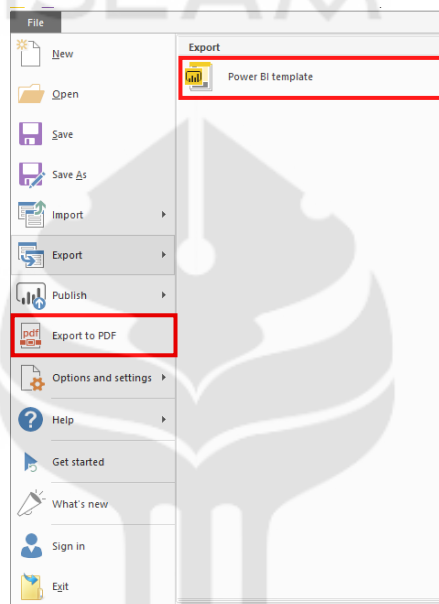


Figure 5.1 Power BI Export Tools

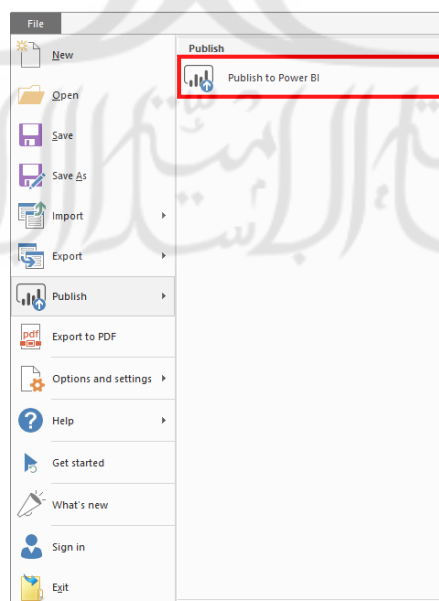


Figure 5.2 Power BI Publish Tools

Both figures 5.1 and 5.2 show that Power BI can only publish the data in Power BI online. Yet, it can export not only for the Power BI template but also as .pdf format.

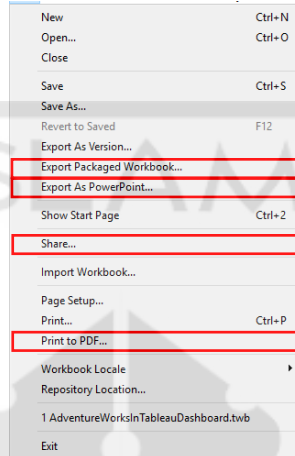


Figure 5.3 Tableau Publish Tools

As shown in figure 5.3 that Tableau also can export the workbook as Tableau Packaged and Pdf format. Yet, the advantage of Tableau can also be exported as PowerPoint format. It is because there is an additional dashboard called story in Tableau that seems as a slideshow presentation. Tableau also can publish the project to Tableau Server and Tableau Online.

2. Data Sources

The product must allow users to connect to various data sources and connectors. Both Power BI and Tableau allow it. Yet, the other product has more advantages as shown in table 5.1:

Tables 5.1 Power BI & Tableau Data Sources List

Tableau Data Sources	Tableau Prep Builder Sources	Power BI & Power Query Data Sources
Tableau Server Data Sources	Amazon Aurora	Excel
Action Matrix*	Amazon EMR Hadoop Hive	Text/CSV
Action Vector 2.0 or later*	Amazon Redshift	XML
Amazon Athena	Apache Drill	JSON

Tableau Data Sources	Tableau Prep Builder Sources	Power BI & Power Query Data Sources
Amazon Aurora	Aster Database	Folder / Local Files
Amazon Elastic MapReduce	Azure SQL Data Warehouse	SharePoint Folder
Amazon Redshift	Cloudera Hadoop	SQL Server Database
Anaplan	Denodo	Access Database
Apache Drill	Exasol	SQL Server Analysis Service Database
Aster database	Google Cloud SQL	Oracle Database
Box	Hortonworks Hadoop Hive	IBM DB2 Database
TIBCO® Data Virtualization	HP Vertica	IBM Informix Database
Cloudera Hadoop Hive and Impala; Hive CDH3u1, which includes Hive .71, or later; Impala 1.0 or later (incl. Kerberos support for Impala)	IBM BigInsights	IBM Netezza
DataStax Enterprise Edition 2.2 or later*	IBM DB2	MySQL Database
Denodo	IBM PDA (Netezza)	PostgreSQL Database
Dropbox	Kognitio	Sybase Database
EXASOL 4.2 or later*	MapR Hadoop Hive	Teradata Database
Firebird 2.1.4 or later	MariaDB	SAP HANA
Google Ads	MarkLogic	SAP Business Warehouse Application Server
Google Analytics	MemSQL	SAP Business Warehouse Message Server
Google BigQuery	Microsoft Access	Amazon Redshift
Google Cloud SQL	Microsoft Excel	Impala
Google Sheets	Microsoft Azure SQL Data Warehouse	Google BigQuery
Hortonworks Hadoop Hive 1.1 or later	Microsoft SQL Server	Vertica
HP Vertica 8.1 or later	Monet DB	Snowflake
IBM BigInsights*	Mongo DB	Azure SQL Database

Tableau Data Sources	Tableau Prep Builder Sources	Power BI & Power Query Data Sources
IBM DB2 9.1 or later for Linux, UNIX, or Windows (available on Tableau Desktop/Server on Windows only)	MySQL	Azure SQL Datawarehouse
IBM PDA Netezza 4.6 or later*	Oracle	Azure Analysis Service
JSON files	PDF	Azure Blob storage
Kognitio	Pivotal Greenplum Database	Azure Table Storage
MapR Distribution for Apache Hadoop 2.x or later*	PostgreSQL	Azure Cosmos DB (Beta)
MariaDB	Presto	Azure Data Lake Storage
Marketo		Azure HDFS
MarkLogic 7.0 and 8.0	SAP Hana	Azure HDInsight Spark
MemSQL	SparkSQL	HDInsight Interactive Query
Microsoft Access 2007 or later*	Splunk	Power BI Datasets
Microsoft Azure Data Lake	SAP HANA	Power BI dataflows (Beta)
Microsoft Azure Data Warehouse	SAP Sybase IQ	SharePoint Online
Microsoft Azure DB	SAP Sybase ASE	Microsoft Exchange Online
Microsoft Excel 2007 or later	Snowflake	Dynamics 365 (Online)
Microsoft OneDrive	Statistical files	Dynamics NAV
Microsoft PowerPivot 2008 or later*	Tableau Extracts	Dynamics 365 Business Central
Microsoft SharePoint Lists, default list view only	Teradata	Dynamics 365 Business Central (on-premises)
Microsoft Spark on HDInsight	Text file	Common Data Service for Apps (Beta)
Microsoft SQL Server 2005 or later (incl. support for Kerberos)		Azure Consumption Insight (Beta)

Tableau Data Sources	Tableau Prep Builder Sources	Power BI & Power Query Data Sources
Microsoft SQL Server Analysis Services 2005 or later, the non-tabular mode only*(incl. support for Kerberos)		Azure DevOps (Beta)
Microsoft SQL Server PDW V2 or later		Azure DevOps Server (Beta)
MonetDB		Azure Data Explorer (Beta)
MongoDB BI		Salesforce Object
MySQL 5.5 or later		Salesforce Report
OData		Google Analytics
Oracle Database 11g Release 2 or later		Adobe Analytics
Oracle Eloqua		appFigures (Beta)
Oracle Hyperion Essbase*		comScore Digital Analytics (Beta)
PDF		Dynamics 365 for Customer Insight (Beta)
Pivotal Greenplum 4.x or later		Data.World (Beta)
PostgreSQL 8.3 or later		Facebook
Presto		GitHub (Beta)
Progress OpenEdge 10.2B patch 4 or later*		MailChimp (Beta)
QuickBooks Online		Marketo (Beta)
Salesforce.com, including Force.com and Database.com		Mixpanel (Beta)
SAP HANA 1.0035 or later		Planview Enterprise One (Beta)
SAP NetWeaver Business Warehouse 7.00 with SP20+ recommended; also requires SAP GUI for Windows 7.20 or later client*		Planview Projectplace (Beta)
SAP Sybase ASE 15.7 or later*		Quickbooks Online (Beta)
SAP Sybase IQ 16 or later*		Smartsheet
ServiceNow ITSM		SparkPost (Beta)

Tableau Data Sources	Tableau Prep Builder Sources	Power BI & Power Query Data Sources
Snowflake		Stripe (Beta)
Spark SQL requires Apache Spark 1.2.1 or later		SweetIQ (Beta)
Spatial files (Esri Shapefiles, KML, GeoJSON, and MapInfo file types)		Twilio (Beta)
Splunk Enterprise 6 or later*		tyGraph (Beta)
Statistical Files; SAS (*.sas7bdat), SPSS (*.sav), and R (*.rdata, *.rda)		Webtrends (Beta)
Tableau Data Extract		Zendesk (Beta)
Teradata 15.00.00 or later		Odata Feed
Teradata Aster Data nCluster 5.0 or later		Active Directory
Teradata OLAP Connector 14.10 or later*		Hadoop Files
Text files -- comma separated value (.csv) files		Spark
Additional databases and applications that are ODBC 3.0 compliant		R script
Tons of web data with the Web Data Connector (SDK)		ODBC
		OLE DB
* Only in Windows		BI Connector
		Exasol
		Denodo
		Dremio (Beta)
		Jethro (Beta)
		Kyligence (Beta)
		Paxata (Beta)
		TeamDesk (Beta)
		Blank Query

Based on table 5.1, it shows that Power BI package and Tableau package have more-less the same data sources list. Yet, there are still many beta versions in Power BI data sources.

Each software has its own advantage regarding the platform but Tableau offers better support to connect distinct data warehouses. However, Power BI has the advantage regarding heavily integration with their company product which is Microsoft's portfolio.

3. Mobility Features

Another additional parameter is mobile analysis whether it is using a smartphone or tablet device. The result shows that both software has this feature. Power BI and Tableau can operate in smartphone and tablet devices. Yet, the researcher will give more points for the Tableau. It is because Power BI can only run in Windows Platform as shown as captured picture in Figure 5.6 to 5.8:

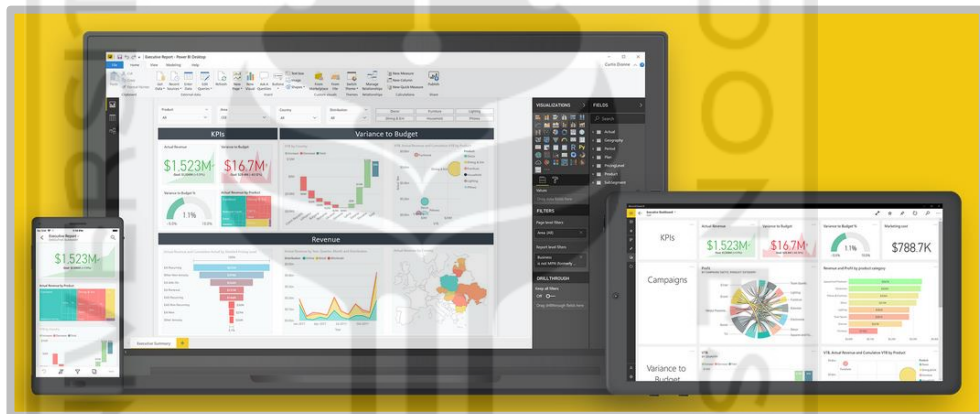


Figure 5.6 Power BI Insight Platform

Power BI can be run in smartphone Apple or Android devices also in tablet devices both Apple and Android but cannot run in Macintosh or Linux and run only in Windows. It is because Power BI is one of many Microsoft products that only built for the Windows Operating System. However, Tableau can run in many platforms as shown as captured in Figures 5.7:

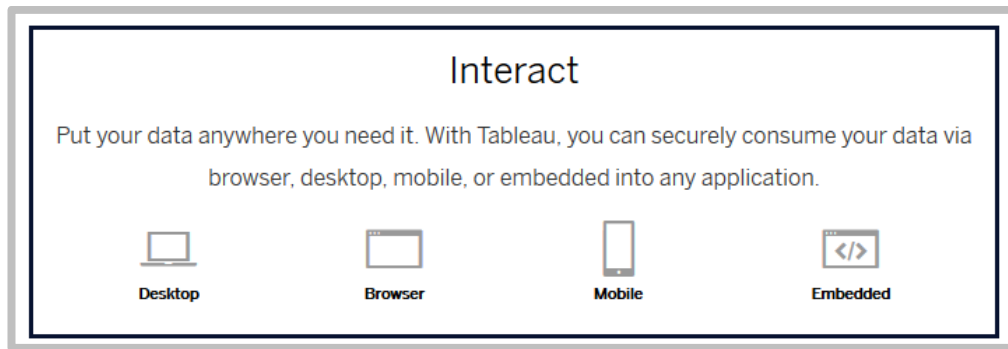


Figure 5.7 Tableau Insight Devices

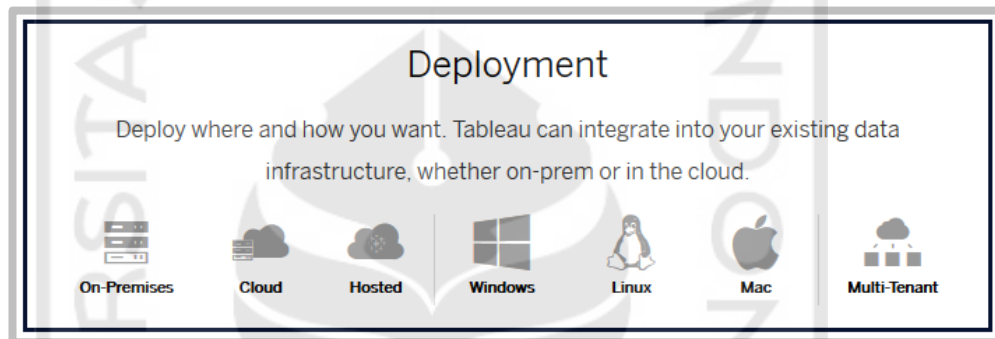


Figure 5.8 Tableau Insight Platform

Figures 5.7 and 5.8 above show that Tableau has more advantages because of better flexibility and mobility than Power BI. Tableau can run in 3 most-using Operating System which are Windows, Linux, and Macintosh. The researcher found that this feature is the important advantage of Tableau to be elected as useful tools. It is because many of the data scientist and data analyst is using Windows but many of them also use Mac and Linux as their daily driver.

5.2.2 Quantitative Measurement

This section is an additional section to support and backup the researcher analysis also the objectivity of this comparative study result. To support all the result of the researcher's analysis, the researcher conducting simple MCDM (Multiple Criteria Decision Making) method. This calculation conduct using questionnaire that ask to expert that ever use both tools which is Power BI and Tableau. Thus, the researcher claim that this data is valid because of all the expert ever use both tools.

5.2.2.1 Scoring System

The scoring system conducting based on the weighted of each parameter that according to (Sherman, 2015). The first 5 parameters will be score 2 times than the last 3 parameters. It is because, according to Sherman that the first 5 parameters are categorized in “Must-Have Features”. However, based on that categorized, the researcher gives those parameters 2 times for the weighted score.

1. Select Data for Analysis (2/13) (P1)
2. Data Blending (2/13) (P2)
3. Create Measures (2/13) (P3)
4. Create Hierarchies (2/13) (P4)
5. Save Queries and Analysis (2/13) (P5)
6. Create, Publish and Export by Business User (1/13) (P6)
7. Data Sources (1/13) (P7)
8. Mobility Features (1/13) (P8)

5.2.2.2 Proposes Rubric Matrix

This rubric proposes by the researcher to be reference for the calculation of weighted score in MCDM method. The rubric will be shown in tables 5.2 to 5.9

Rubric Matrix

Table 5.2 Select data for analysis proposes rubric

SELECT DATA FOR ANALYSIS SCORE: 0.15	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
CRITERIA	Not Exist Not function Not easy to use	Exist Only function as needed Standard convenience	Exist Function more than enough Very easy to use

Table 5.3 Data blending proposes rubric

DATA BLENDING SCORE : 0.15	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
CRITERIA	Cannot blend with various data	Can blend with various data	Can blend with various data

DATA BLENDING SCORE : 0.15	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
	Only blend with single form of data	Accessing the other form of data	Accessing the other form of data Can create relationship and mapping with various form of data smoothly

Table 5.4 Create measures proposes rubric

CREATE MEASURES SCORE : 0.15	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
CRITERIA	Exist for common features	Exist Can create custom measure Custom calculation analysis	Exist Create custom and quick/automatic measure Create custom and quick/automatic calculation

Table 5.5 Create hierarchies proposes rubric

CREATE HIERARCHIES SCORE : 0.15	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
CRITERIA	Exist for create hierarchies Only custom name cannot drill-down	Exist for create hierarchies Custom and quick name Can drill-down Not convenient menu	Exist for create hierarchies Custom and quick name Can drill-down Very convenience menu

Table 5.6 Save queries and analysis proposes rubric

SAVE QUERIES AND ANALYSIS SCORE : 0.15	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
CRITERIA	Exist for common features	Exist features	Exist features

SAVE QUERIES AND ANALYSIS SCORE : 0.15	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
		Cannot reused analysis	Can save analysis individually

Table 5.7 Create, publish, and export by business user proposes rubric

CREATE, PUBLISH AND EXPORT BY BUSINESS USER SCORE : 0.08	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
CRITERIA	Can create cannot publish cannot export	Can create publish to the tools online Export to other format	Can Create Can publish and export Additional convenience platform such as server or cloud services

Table 5.8 Data sources proposes rubric

DATA SOURCES SCORE : 0.08	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
CRITERIA	Standard data sources can connect to open sources	Various data sources Data sources less than 50	Various data sources Data sources more than 50 Can connect to another level connectors such as machine learning

Table 5.9 Mobility features proposes rubric

MOBILITY FEATURES SCORE : 0.08	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
CRITERIA	No mobility features Only run in single desktop stand-alone device	Accessing mobile platform (Android & Apple) Access in web browser	Accessing mobile platform (Android & Apple) Access in web browser

MOBILITY FEATURES SCORE : 0.08	BAD SCORE : 1	STANDARD SCORE : 2	GOOD SCORE : 3
			Cross platform OS (Windows, Macintosh, and Linux)

5.2.2.3 Scoring Calculation

This is the result after calculation using MCDM scoring system, the result will be shown in tables 5.9 and 5.10.

Table 5.10 Power BI Scoring Calculation Result

POWER BI										
Parameters (Weighted Score)										
No	Expert Code	P1	P2	P3	P4	P5	P6	P7	P8	Total
		0.15	0.15	0.15	0.15	0.15	0.08	0.08	0.08	1.00
1	RS	2	3	3	3	3	3	3	3	2.846154
2	KF	3	3	3	3	3	3	3	3	3
3	SK	2	3	3	3	2	2	3	2	2.538462
Total										8.384615
Average										2.794872

Table 5.11 Tableau Scoring Calculation Result

TABLEAU										
Parameters (Weighted Score)										
No	Expert Code	P1	P2	P3	P4	P5	P6	P7	P8	Total
		0.15	0.15	0.15	0.15	0.15	0.08	0.08	0.08	1.00
1	RS	3	3	3	3	3	3	3	3	3
2	KF	3	3	3	3	3	3	3	3	3
3	SK	3	3	3	3	2	2	3	2	2.692308
Total										8.692308
Average										2.897436

Based on the calculation result that shown in tables 5.10 and 5.11, we can see that PowerBI got 2.79 score by 3 and Tableau got 2.89 score by 3. Thus, the scoring result based on the expert means, Tableau is the recommendation tools than Power BI.