
Optimizing The Use of Data Management via Market Intelligence to Optimize Spending in Indonesian Oil and Gas Sectors

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ABSTRACT

Any purchasing or product and service acquisition comes in hidden costs if we dont have background information on references of reference database. Especially in the oil and gas sector where the cost to acquire those services are higher, market intelligence initiatives plays a pivotal role in ensuring we obtain correct market price data with the help of COBIT5 framework.

Keywords: *Market Survey, Market Intelligence*

1. Introduction

As a general rule of thumb 70% of budget allocation from oil and gas company goes to the contractors, which means that we outsource that much, in order to incur savings and further optimize costs, a data management framework containing price reference from market intelligence process is required where the user can tap in those information for budget creation, and procurement can use those information to validate the price/value given by contractors.

COBIT framework utilized

PO2 Define the information architecture.

2.1 Information architecture 2.1

model

2.2 Corporate data dictionary 2.2
and data syntax rules

2.3 Data classification scheme 2.3

2.4 Security levels 2.3

DS11 Manage data.

11.1 Data preparation AC1
procedures

11.2 Source document AC1
authorisation procedures

11.3 Source document AC1
data collection

11.4 Source document error AC1
handling

11.5 Source document DS11.2
retention

11.6 Data input AC2
authorisation procedures

11.7 Accuracy, completeness AC3
and authorisation checks

11.8 Data input error AC2, AC4
handling

11.9 Data processing AC4
integrity

11.10 Data processing AC4
validation and editing

11.11 Data processing AC4
error handling

11.12 Output handling and AC5, 11.2
retention

11.13 Output distribution AC5, AC6

COBIT 3rd Edition COBIT 4.1

11.14 Output balancing and AC5
reconciliation

11.15 Output review and AC5

error handling
 11.16 Security provision 11.6
 for output reports
 11.17 Protection of sensitive AC6, 11.6
 information during
 transmission and transport
 11.18 Protection of disposed 11.4, AC6
 sensitive information
 11.19 Storage management 11.2
 11.20 Retention periods and 11.2
 storage terms
 11.21 Media library 11.3
 management system
 11.22 Media library 11.3
 management responsibilities
 11.23 Backup and 11.5
 restoration
 11.24 Backup jobs 11.4
 11.25 Backup storage 4.9, 11.3
 11.26 Archiving 11.2
 11.27 Protection of 11.6
 sensitive messages
 11.28 Authentication and AC6
 integrity
 11.29 Electronic transaction 5.11
 integrity
 11.30 Continued integrity of 11.2
 stored data

2. Literature Review

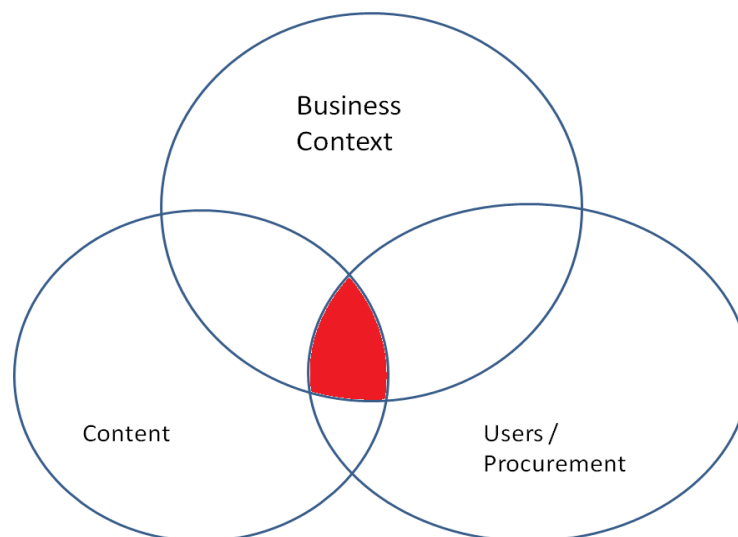


Fig. 1. Information Architecture

The red part is the Information Architecture

Based on Cobit PO2 and DSS11 the Idea is having a concrete reference database consisting of cost of goods and services, but first a foundation of data gathering tools or market intelligence has to be established.

Market Intelligence has 2 primary objectives regarding their activities:

- 1) Provide additional information about the market situation, both price and availability of specific goods / services, which can be useful in the process of budget/ owner estimate creation,
- 2) Provide assistance to the negotiation procurement process (refer to Market Intelligent Object), without giving effect to the lead time of the procurement process and does not violate business and procurement ethics.

Information Technology governance is a policy framework, collection procedures and processes aimed at directing and control of the company in order to achieve the company's goals, provide additional business value, through balancing the benefits and risks IT and its processes in it (IT Governance Institute, 2007 p.5).

IT governance is an integrated part of a framework setting the company, which consists of the leadership, organizational structure, and processes that ensure that IT companies to support and expand strategies and objectives of the organization. In IT governance, the policy is a statement of the directors or management perspective cascaded down to the values that should be achieved in form of tasks

While the procedure itself is a series of systematic activities in response to the COBIT 5 policy, on implementation, IT governance can be defined as the process control and performance improvement done continuously to the application of IT in the enterprise. IT governance process begins with setting goals which will give you directions to perform inline with those goals, finally, performance is measured and compared, the results achieved compared with the results which had previously been achieved and made adjustments in relation to its intended purpose (Lenggana 2007 pp. 5-6).

Usefulness of IT governance is to direct IT activities, and ensure that IT performance meets the following objectives (Lenggana 2007 p. 6):

- a. Alignment of IT with corporate goals.
- b. The use of IT to enable companies harness opportunities and maximize profits.
- c. The use of IT resources responsibly.
- d. Management of IT-related risks appropriately.

There are five areas of vital importance for IT governance; the alignment of business strategy and IT strategy, IT Value Deliver, risk management, performance measurement and management of IT resources. Each of these areas has standard settings described in COBIT guidance. The following description of five areas are the main focus of IT governance, namely (IT Governance Institute 2007 p. 6):

- A. Strategic Alignment, where the problem is related to how achieve the vision, the mission of the organization are aligned with the organization's business.
- B. Deliver Value, how to optimize the added value of IT in order to achieve the vision, the mission of the organization.

- C. Resources Management, which is related to the problem how resources and infrastructure may be inadequate and optimal use. It can be said this issue relates to the optimal investment associated with existing IT, and appropriate management, IT resources are critical applications, information, infrastructure and human resources.
- D. Risk Management, where the problem is related to how identify risks that might exist and how to cope the impact of those risks.
- E. Performance Measurement, which is related to the problem how to measure and monitor the performance of IT and adjusting the use of IT with the business needs of the organization.

The purpose of the application of IT governance can be distinguished by term goals short and long term goals. In the short term IT governance can be used to reduce the cost of IT operations by optimizing operations in it. This can be achieved through controls which applied on every process of the use of IT resources and handling risks. While in the long term implementation of IT governance help companies to stay focused on the strategic value of IT and ensure application of IT continue to support the achievement of corporate objectives (Lenggana 2007 p. 7-8).

COBIT (Control Objectives for Information and Related Technology) COBIT was developed by the IT Governance Institute (ITGI), which is part of the Information Systems Audit and Control Association (ISACA). COBIT provides directives (guidelines) oriented businesses, therefore business process owners, and managers, including the user, is expected can take advantage of this guideline as well as possible.

COBIT is a collection of documentation of best practice for IT governance can assist auditors, management and users to bridge the gap between business risks, control needs and technical issues (IT Governance Institute, 2000 p. 5).

COBIT framework is a set of best practices (best practices) and generic, is used as a reference in determining the target, control (control objectives) and the IT processes required in IT management.

The basic concept of the COBIT framework is that the controls for IT approached by viewing the information needed to support the objectives and business needs, and view information as a result of the combination of various use of IT resources must be managed through IT process to ensure fulfillment of business requirements for information.

COBIT framework consists of three levels of control objectives, starting from the lowest level; activities. Activities are activities routine which has the concept of life cycle. The next set of activities grouped into IT processes (processes), then the processes of IT have the same problems are grouped into domains (domains) (IT Governance Institute 2000 p. 16).

Due to budget constrain and the requirement to have more and more value in obtaining IT performance, the alignment between business and information technology is became a prominent area of concern. Since then, the importance of alignment has been well known and documented.

View of business and technology alignment defines at which degree the information

technology mission, objectives, and plans, support and are supported by the business mission, objectives, and plans (Carvalho, Sousa, 2008). Furthermore, it involves “fit” and “integration” among business strategy, IT strategy, business infrastructure, and IT infrastructure (Henderson, Venkatraman, 1993). However, a relevant “problem” (Pereira, Sousa, 2003) is the understanding of what business and information systems alignment is how to obtain and maintain it. Traditional approaches mainly focus on how organizations can achieve alignment, but with less contribution on how to detect and correct misalignment.

Difficulties in aligning IT strategies to business goals nowadays often pose a significant problem for all IT executives, how much is enough and how far should we go, a general definition of alignment has been generated as “the degree to which the needs, demands, goals, objectives, and/or structure of one component are consistent with the needs, demands, goals, objectives, and/or structure of another component” (Nadler and Tushman, 1980), that’s when ITG is required.

Information and Technology governance (ITG) is a subset discipline of corporate governance first appeared in 1993. The focus of ITG is on information and technology (IT) and its performance and risk management. IT governance is putting structure around how the enterprises align their IT strategy with their business strategy, ensure that the whole company stays on track to achieve their business goals and IT goals, and at the same time, ITG need to perform the measurement of IT performance. A framework in the area that has had a great deal of impact is COBIT (Control Objectives for Information and related Technology). According to COBIT, ITG need to ensure that all the stakeholders’ interests should be taken into consideration when decide the IT strategy, Control Objectives for Information and related Technologies (COBIT) was first developed in 1996 by the Information Systems Audit and Control Association (ISACA) (Hill P. and Turbitt K, 2007).

Below are the 5 principles of COBIT 5:



Fig. 2. COBIT 5 Principles

IT Governance cannot be successful without an effective model, which makes it possible and effective. Many researches has been accomplished in the IT Governance enablers' area since its emerging until now, seeking the best way to enhance planning, organizing, implementing and assessing IT Governance. Thus, many frameworks and models had been appeared and they had showed different levels of impact on IT Governance. COBIT 5 (Control Objectives for Information and related Technology) is considered as the latest framework. COBIT 5 is a model of five domains; Evaluate, Direct and Monitor (EDM); Align, Plan and Organise (APO); Build, Acquire & Implement (BAI); Deliver, Service & Support (DSS); and Monitor, Evaluate and Assure (MEA). Each domain is a panel of many processes.

COBIT model and help realizing the interaction between the enterprise strategy and IT strategy, and also provide reference value for the improvement. COBIT 5 introduces five new governance processes that have leveraged and improved COBIT 4.1. , Simply stated, COBIT 5 helps enterprises to create optimal value from IT by maintaining a balance between realising benefits and optimising risk levels and resource use.

Koen Brand & Harry Boonen (2006) defined the Cobit as a “model for control of the IT environment. It supports IT governance by providing a comprehensive description of the control objectives for IT processes and by offering the possibility of examining the maturity of these processes”.

IT Governance Institute (2012) stated that “COBIT 5 is an operational model and a common language for all parts of the business involved in IT activities. It also provides a framework for measuring and monitoring IT performance, integrating best management practices, governance and communicating with stakeholders”.

ISACA (2012) stated that COBIT 5 supports the Governance of IT by providing a framework to ensure that:

- IT is aligned with the business (Strategic Alignment);
- IT enables the business and maximizes benefits (Value Delivery);
- IT resources are used responsibly (Resource Management);
- IT risks are managed appropriately (Risk Management);
- IT services are measured (Performance Measurement).

Market intelligence main flow is as the following:

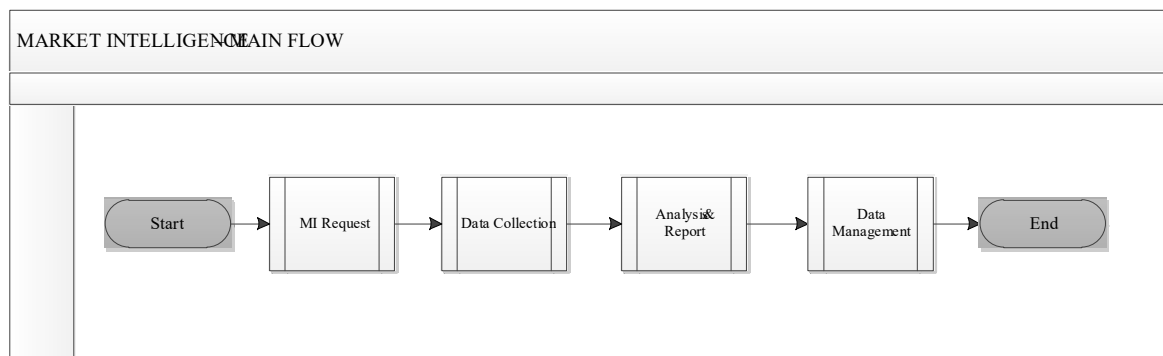


Fig. 3. Market Intelligence Main Flow

There are 3 classifications of objects which can be accepted for Market Intelligence process, they are:

1) **Procurement List Possibility**

Each year, Procurement List composed of goods and services that will be required in the next year are compiled, Market Intelligence could further assist in this process (please refer to flow chart) in order to keep deviation of value from proc list to actual as minimum as possible.

2) **Pilot Procurement Material and Services**

Pilot Procurement is procurement type which has not been conducted before. Therefore there is a requirement to understand the market at the initial stage and common contract structure. Market Intelligence role in this type of procurement will mainly for budgeting and procurement plan purposes.

3) **General Procurement for MI**

General Procurement for MI is object which neither considered as “Procurement List Possibility” nor as “New Procurement”, but have high Owner Estimate (OE) value (> USD 100,000 for services and > USD 50,000 for material). Assist Failed Procurement Process after last negotiation if price >10% than Owner Estimate), provide market intelligence to analyze and improve owner estimate.

Type of Request

There are 3 types of requests that can be accommodated by Market Intelligence, they are:

1) **Planning / budgeting**

The purpose is to support budgeting process. This type of request should be performed before or during the budgeting process.

2) **Regular procurement process**

This type of request has aim to provide a better preparation of the information in the procurement process, especially for the needs of the negotiations.

3) **Failed procurement process**

This type of request has aim to provide a better preparation for the procurement re-tender process.

3. Research Methodology

Methodology used in this paper is a quantitative and qualitative method and literature based on the concept guidelines framework COBIT 5.

Data Collection Method

General Description

Market Intelligence has some basic mechanisms to obtain data or information in conducting the process. There are five classifications of data collection methods can generally be carried out by the Market Intelligence:

1) **Request for Information (RFI)**

Request for Information (RFI) is a request sent by MI for contractors to gather information of their products and default quotation. This activities is should perform outside from procurement process. RFI has no legal commitment to the request and information provided by the Supplier. RFI has the advantage of the detailed information can be obtained, but it has limitations in data collection time concern. RFI has advantages for the budgetary process or the preliminary cost estimate.

2) Historical Data Reference

- **Historical Order Data**

Historical Order Data is referred to Order Data that have been previously done (Released SO / PO / contract). Historical Order Data has advantages in the time expectation to collect the data, but has limitations in the availability of data and also the validity of data in time perspective.

- **Historical Quotation Data**

Historical Quote Data is price data obtained from the bids that have been proposed by bidders in previous procurement process. This data has the advantage of the quantity of data but it has shortcomings in the practicality in data collection & processing.

- **Previous Market Research Result**

Utilize a variety of information, reports, analysis, and other which previously found / made / publish to be reused for the next occasion.

3) Internet Reference

Information retrieval through the internet conducted with the purpose to obtain relevant information. This process has the advantage of the flexibility and updated information, but has shortcomings in data availability and reliability.

4) Data Subscription

Data subscription is a subscription / registration to the Professional Information Provider. Information providers will provide data periodically or in such an event basis. Data subscription has advantages in ease and certainty of the data collection process, but has the disadvantage of the economy and the direct relevancy between the obtained and the required data.

5) Contract Benchmarking

Contract Benchmarking is a process of source searching to study the concept and the contract prices of other Oil & Gas Exploration & Production Company having similar parameters (size, locations) with KEI. This retrieval process can be done in the form of strategic cooperation and through the other method. The results obtained from the Contract Benchmarking can provide information on where is a market price in general. The information resulting from the Contract Benchmarking process is managed Historical Data Reference.

The above data collection method should be determined for the most suitable method in accordance to the situation or requirement. The data collection method can be chosen independently or combined based on comparison table between them in the following section or can be used the recommendation that already determined in the approval process of Market Intelligence Request.

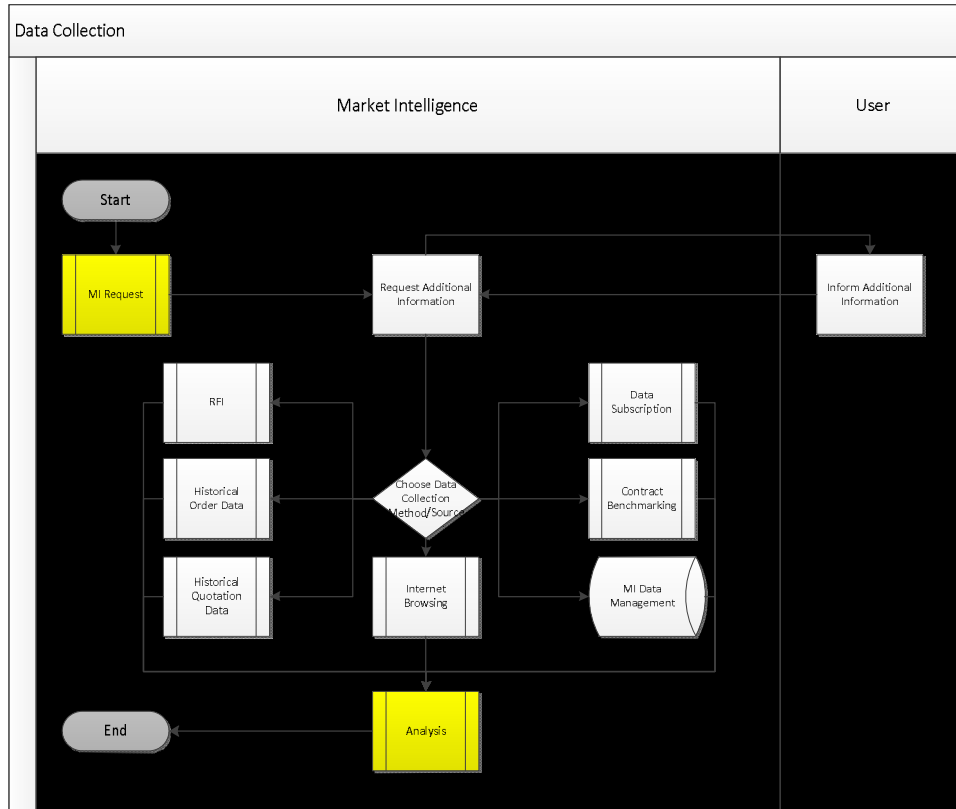


Fig. 4. Data Collection

Here is the comparison of each data collection method, this comparison should be used as the consideration when determine which method should be chosen based on the requirement or concern:

Table 1. Comparison of Data Collection Method

	Request for information	Historical Order Data	Historical Quotation Data	Historical Market Research Result	Internet Browsing	Data Subscription	Contract Benchmarking
Data collection time consume	Low	Medium	High	High	Medium	High	Low
Data relevancy possibility	High	High	High	High	Low	Low	High
Data availability possibility	High	Medium	Medium	High	Medium	High	Low
Time accuracy possibility	High	Low	Low	Medium	Medium	High	Medium
Potential Vendor Information	High	Low	Low	Medium	High	Low	High
Direct cost	No direct cost	No direct cost	No direct cost	No direct cost	No direct cost	Have direct cost	No direct cost
Data source	External	Internal	Internal	Internal	External	External	External

Request for Information (RFI)

Standard Time

Standard time for RFI data collection is as the following:

Table 2. Standard Time for RFI Data Collection

Process	Working day
Information preparation by requester	1
RFI Document preparation by Market Intelligence	1
Supplier response to RFI	6
Total	8

Line of Approval

Line of Approval for RFI letter is as the following:

Table 3. Line of Approval for RFI Letter

RFI letter			
Order	Title	Activity	Type
1 st	Market Intelligence	Prepare	Initial
2 nd	Excellent Practices Coordinator	Approve	Sign

Process

Here are the steps in the data collection process using RFI:

- 1) Requester send the general information of the goods / services (at least the information consist of the scope and details of the breakdown price)
- 2) MI prepares & send RFI document to potential supplier
- 3) Supplier receive, prepare, and respond to the RFI (if no respond from supplier MI scheduling for visit or propose meeting only for High Potential Contractor in/or High Value Project)
- 4) MI response processing supplier in the form of reports

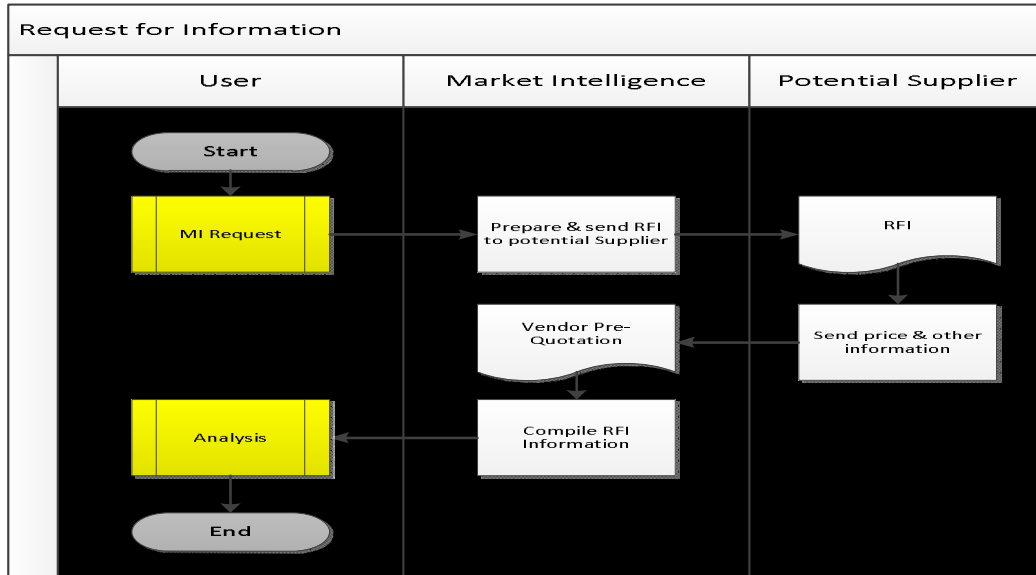


Fig. 5. Request for Information Cross Functional Flowchart

Data and Information Gathered

Common data and information that can be gathered from RFI are:

- 1) Pre-quotation price, including their terms & conditions, also includes price validity of RFI
- 2) New potential supplier which can supply certain product / services.

Limitation

Several limitations regarding data collection using RFI are:

1. RFI should not be performed if there is similar object which is under on going procurement process. It is to maintain good business ethics of the bidders who are participating in the procurement process, and suppliers who submit information but did not participate in the procurement process it self.
2. Supplier's name on the RFI is confidential. Market Intelligence should avoid bidder preferences in procurement process.

Historical Order Data

Standard Time

Standard time for Historical Order Data's data collection is as the following:

Table 4. Standard Time for Historical Order Data

Process	Working day
Information preparation by requester	1
Information collection	2
Total	3

Process

Historical order data is divided into two classifications, material and services. Material data is basically stored in the database in specific manner, whereas the services data only stored in total value.

1. Material

Material data can be obtained through Oracle, E-procurement System, & Catalogue Search System.

2. Services

Services data can be obtained through Oracle in text basis or in contract document.

Data and Information Gathered

Data and information that can be obtained through the Historical Order Data usually is unit price per item on previous orders, including their scope of work.

Internet Reference**Standard Time**

Standard time for this data collection is as the following:

Table 5. Standard Time for Data Collection

Process	Working day
Information preparation by requester	1
Information collection	2
Total	3

Data and Information Gathered

Data and information that can be obtained through the Internet Browsing usually is:

- 1) Product unit price
- 2) Currency exchange rate at time of price reference
- 3) Crude oil price for oil based product price reference
- 4) Commodity price (such as relation of metal price with tubular price)
- 5) New potential supplier

Data Subscription**Data and Information Gathered**

Data and information that can be obtained through Data Subscription:

- 1) Product unit price
- 2) Currency exchange rate
- 3) Crude oil price
- 4) Commodity price
- 5) New potential supplier

Contract Benchmarking**Data and Information Gathered**

- 1) Pokja BPMIGAS
- 2) Others KKKS having similar parameter with Company.

4. Conclusion

Market Intelligence has several kind of final report resulting from the process of data collection & analysis. In general there are three classifications of final report that can be created by Market Intelligence and further assist the price reference problem solving.

A. Price Tabulation

Price Tabulation is report which give price comparisons between items both in terms of price and other supporting information. Price Tabulation is useful in providing price information from various sources and in easy way to compare. Price tabulation has shortcomings in terms of the validity regarding time concern.

B. Price Trend Estimation

Price Trend Estimation is a report which presents estimates of price changes associated with the consideration of time periods and the movement of the cost/product component. Price trend estimation is useful to give estimate position if the price is adjusted to different time and different purchasing power of money. Price trend estimation has shortcomings in the level of detail of each component of the price.

C. Budgetary

Budgetary is reports that specifically present the structure and the cost concept of a new procurement for budget preparation purposes. Budgetary basically provide similar information with price tabulation but will have more detail information about procurement budget creation.

Here is a comparison of each type of report:

Table 6. Comparison of Each Type of Report

	Price Tabulation	Price Trend Estimation	Budgetary
Main information	Unit price comparison	Price estimation	Price information and contract concept
Value adjustment due to change of time	Without adjustment	With adjustment	Without adjustment
Processing time	High	Medium	Low
Standard time	7 workdays	10 workdays	1 Months

Price Tabulation**Process**

General process that should be done in making the Price Tabulation is:

1. Finding data for comparison

Comparative data can be obtained through historical order data and RFI. Data comparison is selected from the most similar product & scope of work.

2. Report preparation

Reports in the price tabulation should be able to explain:

- The data used and their sources
- Comparison per unit prices
- Comparison of external factors (differences of the scope of work, specifications, market conditions, etc)
- Supplier alternative
- Recommendations / analysis summary

Budgetary

Process

General process that should be done in making budgetary is:

1. Find and process the data reference

Reference data for budgetary purposes can be obtained through the RFI.

2. Report preparation

Budgetary reports should be able to provide:

- Comparison of the unit price of all data sources
- Cost structure along with the estimated price (if needed & may have alternative)
- Contract concept (if needed & may have alternative)
- Supplier alternative
- Recommendation / analysis summary

Market Intelligence Report

General Description

Market intelligence updates their work progress progressively. Market Intelligence report at least should be able to contain the following information:

Request Information

1. General data of requester (Name & Department)
2. Type of request object
3. The title of object request
4. Purpose of the request
5. Time demand
6. Expected completion of work
7. Approval status

Information Processes and Outcomes

1. Time to start work
2. Time process for each work
3. Data collection methods
4. Types of reports
5. Time completion
6. Notes / constraints

Market Intelligence Data Management

Market Intelligence performs additional data management for own purposes. Management data is performed by using a spreadsheet database file. There are four types of Data Management that is generally managed by the Market Intelligence which is:

1. Analysis archive

An archive folder which stored in structured way so it can support a simple search. It mainly contains the articles / reports that have been obtained or done before.

2. Unit Price Database (services)

A structured list containing tabular comparison of unit prices for the provision of services. Most of the data stored in data management is the result of Price Tabulation Report. Unit price database should be able to accommodate data in packages (e.g. Drilling Project).

3. Cost Factor List

A structured list of products / services and their independent variable (cost factor) which is expected can significantly influence the products / services.

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