

Statistical Programming Outsourcing KPI Dashboard

A tool for better collaboration

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ABSTRACT

Outsourcing has become a norm in the pharmaceutical industry. Functional outsourcing allows the company to focus on core competencies, distribute risk, and to access a pool of flexible skilled resources. A Service Level Agreement (SLA) is typically used in outsourcing. It defines the scope of the outsourced project/function, as well as the acceptance criteria of the deliverables/services received. SLA aligns the expectation for both sides of the partnership and establishes the key performance indexes (KPI) to measure the service provider's performance and commitment towards the objectives.

Tracking and Reporting of the KPIs is an essential part of any outsourcing management and governance. This paper describes an automated tool which analyzes the collected metrics, and provides a "dashboard" view of progress against measurable goals. This dashboard provides data driven indicators which can be used to evaluate the success of the partnership, to identify area for improvement, and to make strategic decisions. The outsourcing KPI dashboard tool is developed using SAS[®] Base and ODS technology. It follows a flexible modular structure with a library of KPI reports. Each piece can be easily added, updated or removed. To accommodate different business needs, the tool also supports the flexibility to display dashboards at different granularity (ie. high level or per deliverable, at a specific time point or over time).

INTRODUCTION

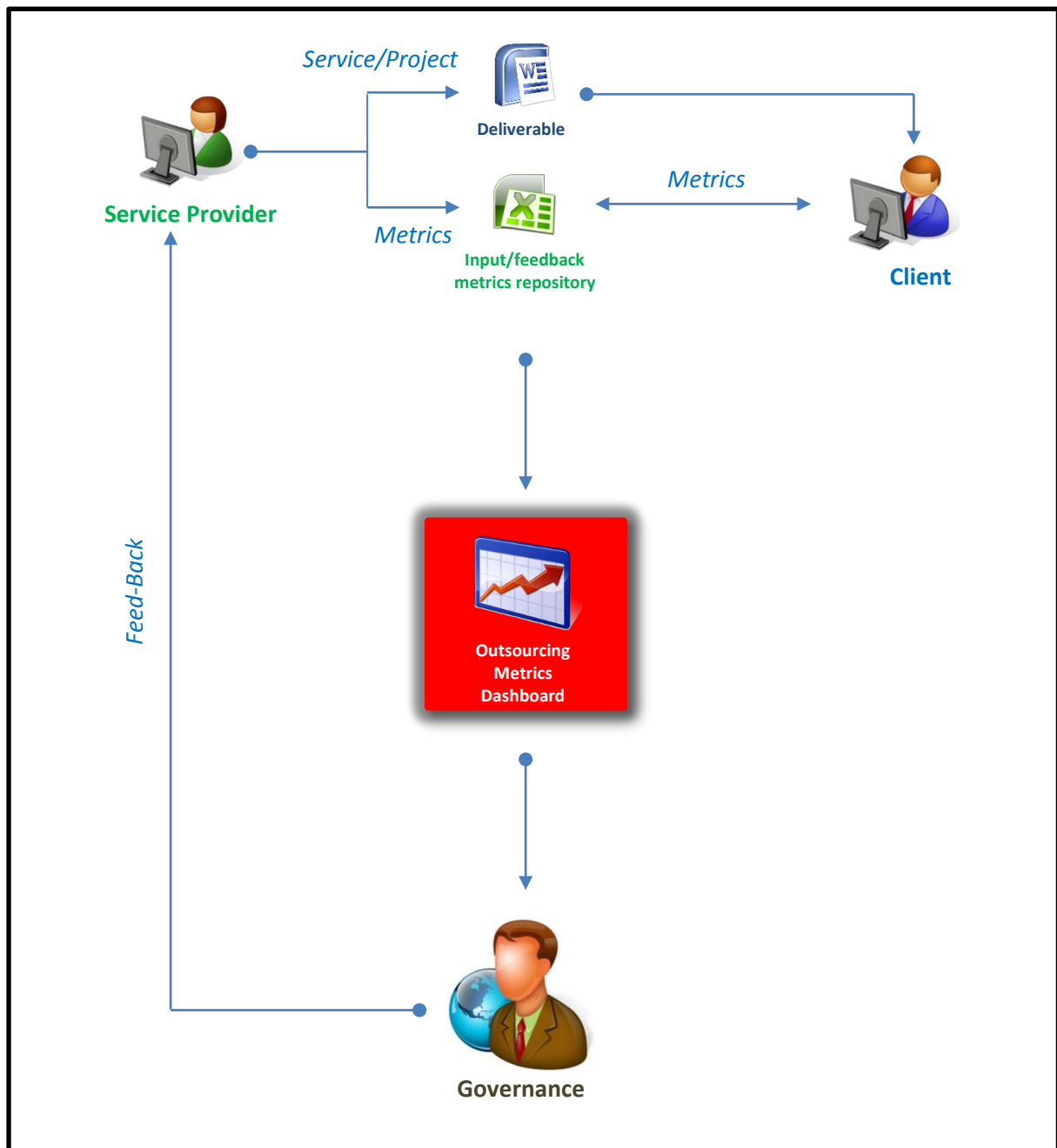
As every other industry, most of the pharmaceutical companies have at least considered, if not yet started, to outsource certain functions or deliverables. Outsourcing is used not only to reduce cost nowadays, but also as part of the business strategy. Its benefits are well studied. Outsourcing allows the company to focus on its core competence, to share the risk with third party vendors, and to access a flexible pool of skilled resources.

However, it also comes with risks of reduced quality due to handovers. Diligent tracking of the progress against the objectives during collaboration is therefore essential to the outsourcing management and governance. The scope and target of the outsourced function/projects are typically defined in a Service Level Agreement (SLA) which describes the kind of service/deliverables the service provider is expected to deliver to the client, the quality acceptance criteria of the service received, and the metrics – Key Performance Indexes (KPI) used to measure the performance. The selection of the KPIs is crucial to an effective performance tracking. The KPIs can be project/deliverable-related like the quality index as measured by client satisfaction, or timeliness as indicated by the planned target delivery date versus the actual delivery. The KPIs can also be on the partnership management itself, with metrics like the vendor staff retention or cost-effectiveness of the outsourced resources. Other measurements e.g. waste KPIs to measure rework occurred during the outsourcing, can also be defined. The selection of the KPIs itself is a topic of much research and is beyond the scope of this paper.

This paper introduces an automated tool which analyzes the collected inputs from both the service provider and the client, and provides a "dashboard" view of the healthiness of the partnership as measured by a set of pre-defined KPIs. The dashboards present a graphical view of those metrics at a specific time point or over time against the target and provide data-driven indicators to evaluate the success of the partnership, to identify area for improvement, and to make strategic decisions. The tool is developed using SAS[®] Base and ODS technology. It follows a modular structure and contains a library of KPI reports which can be easily assembled, replaced, updated or enhanced. A result of this flexible design, the tool can be adapted to support outsourcing of different projects/functions in any industries with access to SAS technology.

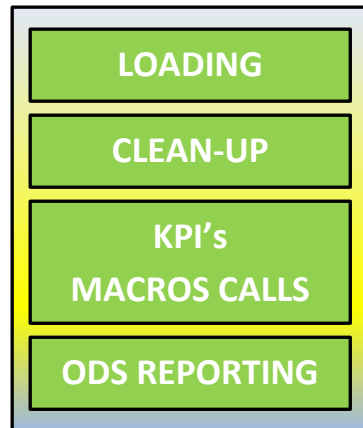
HIGH LEVEL PROCESS FLOW

Figure 1 is a process flow chart describing how the dashboard is created, used and who the key stakeholders are in this process. The process contains mainly 3 parts: data collection, dashboard generation and dashboard review. Both the service provider and the client provide their inputs. As an example, the service provider can feed inputs on the number of deliverables, actual delivery dates or the number of resources involved in development, in QC and in rework. The client provides metrics on the target dates and the satisfaction level, e.g. quality assessment or any feedbacks about the collaboration. Those collected data serve as inputs and are analyzed by the outsourcing KPI dashboard toolkit. Dashboards are generated and then reviewed by the parties at different levels of decision making on both sides of the partnership, either to provide feedback for process improvement or to define business strategies.



OUTSOURCING KPI DASHBOARD TOOLKIT

Modular Structure



The outsourcing KPI dashboard toolkit offers the user great flexibility thanks to its modular structure. It is built with several modules independent to each other which can be customized, added or dropped from the main program based on the business needs.

The figure above provides a high level block view of the different modules. The tool starts with an input loading module. It interfaces with the metrics collection system and converts the metrics into the necessary format for further processing. An optional data management module is then provided which checks the quality of the input metrics and resolves data inconsistencies.

The KPI library contains a suite of pre-specified KPIs. Each KPI has its corresponding reports using ODS technology. The ODS reports may also be adapted if the user needs outputs in another format than the default PDF. This can be done by updating the ODS reporting module with the preferred output statements.

Input Metrics Repository

The input repository format in the current release is Excel sheets for easy filtering, sorting and tabulating. The example below shows several deliverables for dummy projects with data for a quarter of year. It shows the timeliness in which the partner provides the service and the quality assessment during this quarter. Frequency and over time analysis may be done based on this set of data.

Partner	Compound Number	Protocol Number	Deliverable Type	Number of Item Deliverables	Target Start Date	Actual Start Date	Delivery Target Date	Delivery Actual Date	Partner resources spent on		Total Partner resources spent on those deliverables (Re-work incl.) (FTE days)	Quality as assessed by Merck staff
									Development (Re-work incl.) (FTE days)	QC (Re-work incl.) (FTE days)		
MyPartner	DUMMY	DUM4	Type1	12	2-Jan-12	2-Jan-12	4-Jan-12	4-Jan-12	0.3	1.125	1.425	2- good
MyPartner	DUMMY	DUM4	Type2	75	6-Jan-12	7-Jan-12	15-Feb-12	20-Feb-12	5	1.25	6.250	3- issues with numbers
MyPartner	DUMMY	DUM4	Type3	13	22-Feb-12	22-Feb-12	4-Mar-12	4-Mar-12	0.4	0.2	0.600	2- good
MyPartner	DUMMY	DUM5	Type1	29	5-Jan-12	5-Jan-12	20-Jan-12	24-Jan-12	0.35	1	1.35	2- good
MyPartner	DUMMY	DUM5	Type2	60	11-Jan-12	11-Jan-12	15-Feb-12	15-Feb-12	0.2	1.5	1.7	4- issues with code efficiency
MyPartner	DUMMY	DUM5	Type3	20	22-Feb-12	22-Feb-12	4-Mar-12	4-Mar-12	0.7	0.2	0.9	3- issues with numbers
MyPartner	DUMMY	DUM6	Type1	14	2-Feb-12	2-Feb-12	4-Feb-12	24-Feb-12	0.4	1.125	1.525	2- good
MyPartner	DUMMY	DUM6	Type2	90	6-Feb-12	7-Feb-12	15-Feb-12	15-Feb-12	2.5	1.5	4	2- good
MyPartner	DUMMY	DUM6	Type3	5	22-Feb-12	22-Feb-12	14-Mar-12	14-Mar-12	0.5	0.2	0.7	2- good
MyPartner	DUMMY	DUM7	Type1	1	2-Mar-12	2-Mar-12	4-Mar-12	4-Mar-12	0.75	1	1.75	2- good
MyPartner	DUMMY	DUM7	Type2	10	6-Mar-12	17-Mar-12	17-Mar-12	20-Mar-12	0.25	1	1.25	5 -issues with SOP compliance
MyPartner	DUMMY	DUM7	Type3	98	17-Mar-12	18-Mar-12	31-Mar-12	31-Mar-12	0.25	0.25	0.5	2- good

SAS® Code Structure

Hereafter is the framework of the tool. It illustrates how modules are assembled in SAS code to create a dashboard.

This piece of code translates the modular structure in SAS. The different macro calls are executed to ensure some functions as the import of data with %loadinput macro, the database clean-up (check and correct date and other crucial data formats), the cutoff patch with low- and update definition, the cover page creation and the dashboard creation itself thanks to the ODS statement¹.

In this ODS statement, a not exhaustive list of KPIs macro calls are proposed. Up to the user to remove or insert other calls according to his needs.

```
* Load the project metrics sheets ;
*****;
%let msheet=%str(    <&location1>\Partnership Dashboard Input Metrics-<Partner>-<Stream1>.xls|
                    <&location1>\Partnership Dashboard Input Metrics-<Partner>-<Stream2>.xls|);

%loadinput(msheet=&msheet,dsout=allinput);

* Clean the data ;
*****;

%cleanitup(partner=<Partner>,type=<TypeOfDashboard>,fa=<FunctionalArea>);

* Define macro parameters for the start and the end of the Timeframe of interest;
*****;

%let lowdate = <TimeframeLowLimit>;
%let update  = <TimeframeUpLimit>;

* Create PDF Dashboard ;
*****;

ods pdf file="//teamspace.merck.com/.../PartnersStreamsDashboard-&stream.-&sysdate..pdf"
startpage = on;
ods layout start;

options number;

*** Create a cover page ***;

%coverpage(version=<Version>,partner=<Partner> - <Stream>, user=<User>);

ods layout end;

*** The KPIS ***;
ods layout start;

%timefreq(    dsin          = allinput
              ,observation_where = <Deliverable_type_whereclause and Time_whereclause>
              ,subtitle         = %str(Yearly Summary)
              ,odsregion        = %str(x=0 pct y=0 pct height=40 pct width=100 pct)
              );

%timeliness(  dsin          = allinput
              ,observation_where = <Deliverable_type_whereclause and Time_whereclause>
              ,subtitle         = %str(Yearly Summary)
              ,odsregion        = %str(x=0 pct y=0 pct height=40 pct width=100 pct)
              );

%quality(     dsin          = allinput
              ,observation_where = <Deliverable_type_whereclause and Time_whereclause>
              ,quality_where     = <quality_whereclause>
              ,subtitle         = %str(Yearly Summary)
              ,odsregion        = %str(x=0 pct y=0 pct height=40 pct width=100 pct)
              );

(...)

ods layout end;
ods pdf close;
```

¹ The ods layout statement is a new experimental feature for SAS v9.0 and 9.1.

KPI library

The different KPI's are implemented as SAS macros and are stored in a library from which the user will be able to make his choice to build his own dashboard. These macro programs provide similar interface to allow data selections or output fine-tunings.

Examples of macro parameters:

Data selection parameters

observation_where	=	criteria used to select the input metrics to be summarized (e.g. certain time period, or deliverable)
timeunit	=	time interval used to summarize the performance (e.g. monthly, weekly or quarterly).

Formatting parameters

odsregion	=	ods region statement to position the plot as part of the page.
ymin	=	minimum value of yaxis.
ymax	=	maximum value of yaxis.
xaxis	=	xaxis statement as in SAS graph format.
subtitle	=	subtitle.

Here are some examples of typical KPI's available in the library:

- *Timeliness by deliverable type, Timeliness over time*
- *Quality Rating, Quality by deliverable type, Quality over time, Quality over time,*
- *Productivity,*
- *Amount of Rework, Reason of rework, Rework versus Development*
- *Cost of resources,*
- *Staff retention*

All KPI macros share similar programming interface. New macros can be added which follow the same structure. Depending on the parameter selection of each macro, the KPI can be measured on a particular deliverable or across all service received from the vendor; at a specific moment or over time. The necessary KPIs are then assembled to form dashboards with different levels of details. A high level dashboard typically contains limited number of key indexes for overall performance over time to be reviewed by the executive management. A more detailed dashboard (e.g. by deliverables) are typically reviewed by the vendor management personnel to monitor the trend and to identify area for improvement.

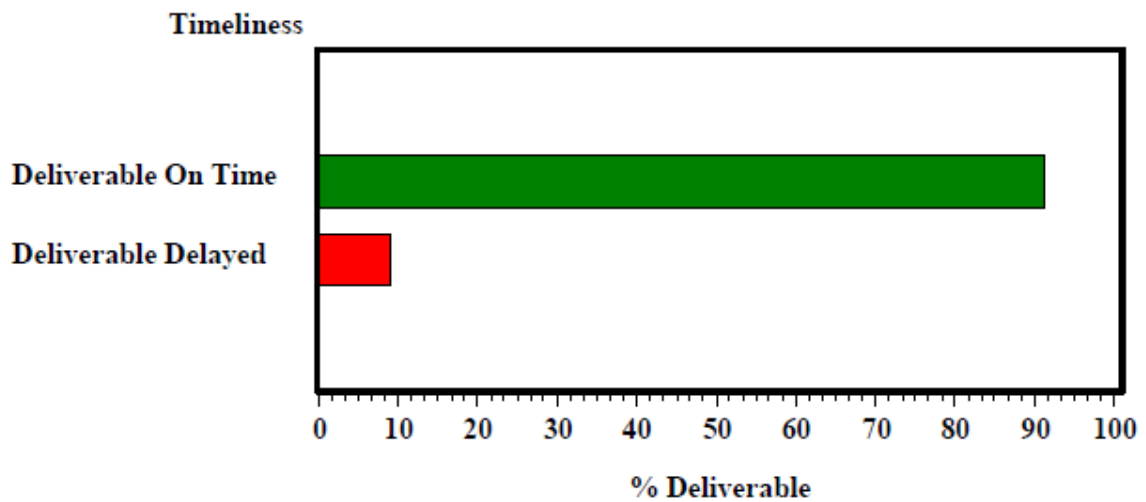
ODS reports

The dashboard could be created in any formats supported by ODS. PDF is used in the current release. Some examples are provided below.

Timeliness

This report displays the percentage of deliverables on time versus delayed. This percentage is calculated as the number of deliverables on time divided by the total number of deliverables completed in the last year. This KPI shows the partner's capacity to meet the timeline. An optional accompany listing may also be generated with details on the delayed deliverables which can be used to identify the reason for delay and action to be taken in the future.

Timeliness across all deliverables – MyPartner April 2012 to March 2013

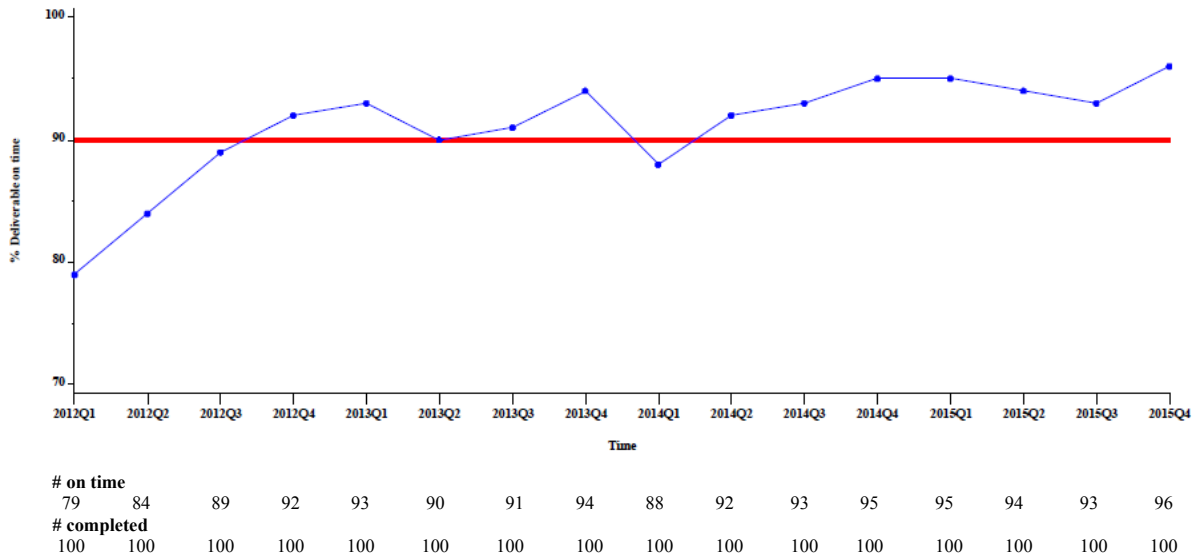


Note that % is calculated as
of deliverables on time / total # of deliverables completed for the last past year

Timeliness Over Time

The "Over Time" graph displays the timeliness of the service provided through the selected period (e.g. one or more years) calculated as the percentage of deliverables on time at each quarter. This KPI shows the partner's performance evolution over a defined timeframe, against an acceptance criterion (e.g. 90% on time) and provides a graphical view to identify the trend.

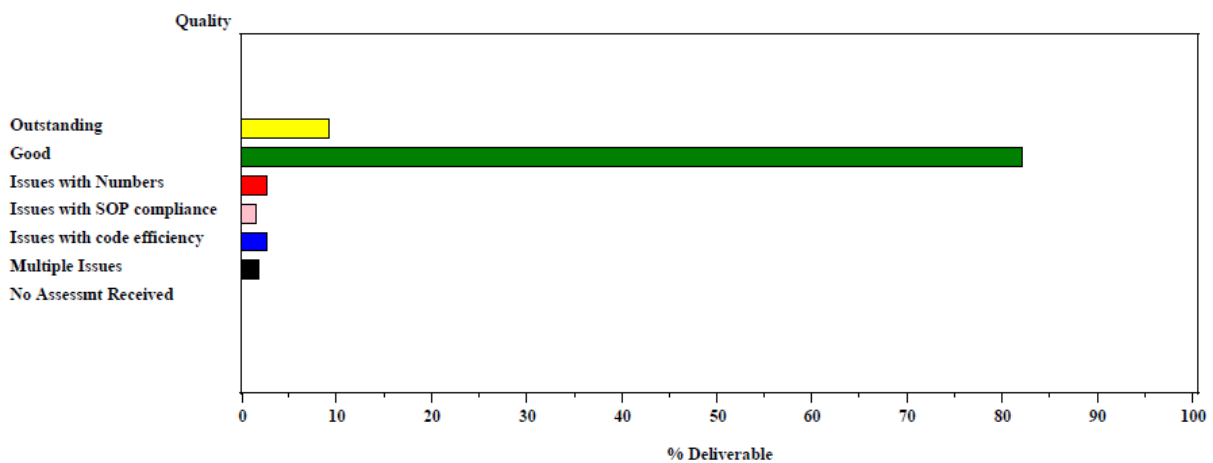
Timeliness Over Time – MyPartner Quarterly Summary



Quality

This KPI is based on the feedback from the client. The horizontal bar graph displays the percentage of deliverables for each category of quality assessment. The percentage is calculated as the number of deliverables by the total number of deliverables completed in the last year.

Quality Assessment Frequency – MyPartner Yearly Summary



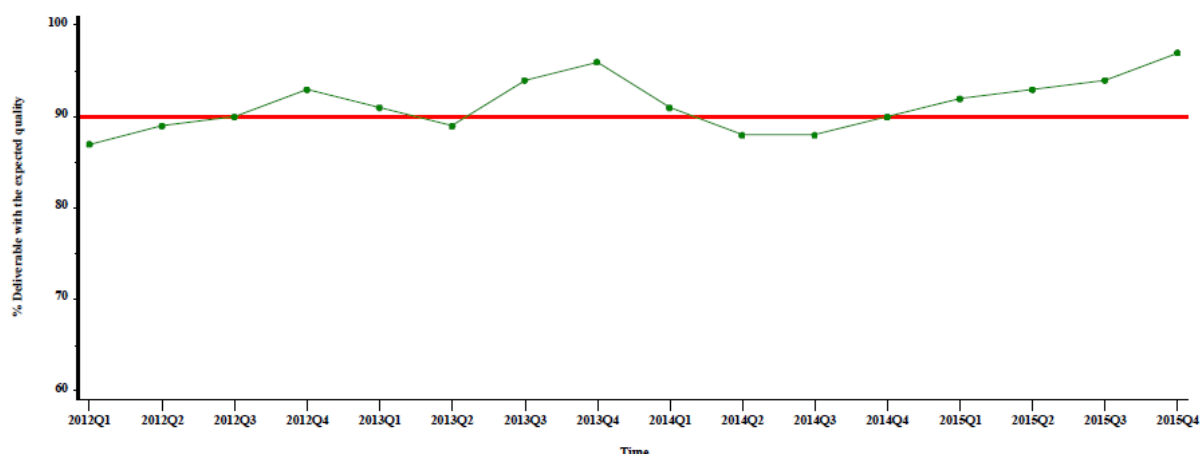
Note that % is calculated as

$$\frac{\text{\# of deliverables with the expected quality}}{\text{total \# of deliverables completed for the last past year}}$$

Quality Over Time

The “Over Time” graph displays the quality of the service (as perceived by the clients as either good or outstanding) and is calculated as the percentage of deliverables at each quarter. This KPI shows the partner's performance evolution over a defined timeframe, against an acceptance criterion (e.g. 90% good or outstanding) and provides a graphical view to identify the trend.

Quality Over Time – MyPartner Quarterly Summary for Outstanding or Good Quality



good or outstanding

87	89	90	93	91	89	94	96	91	88	88	90	92	93	94	97
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completed

100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

CONCLUSION

With outsourcing being used more and more in different functions and projects, it's crucial to monitor and analyze the performance metrics to evaluate the success of collaboration and to improve on the process. This paper introduced an automated tool which generates “dashboards” for the key performance indexes. The tool is developed in a modular structure with a library of KPI reports, and provides the flexibility to show dashboards at different granularity per business needs. Frequency and trend reports have been implemented in the current release, with a pre-defined library of typical KPIs. However the design of the toolkits allows flexibility for companies to create its own dashboard based on what is needed.

This tool can naturally be improved in the future. As an example, it would be a welcome feature to add a graphical user interface for non-SAS programmer to produce an on-demand dashboard.

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