



Key performance indicator systems for the production industries

Key performance indicators (KPIs) are becoming ever more important for assessing the competitiveness of production companies relative to others from around the world. Such key performance indicators are nowadays used in every department of a company: from monitoring targets for the company, division and department through up-to-date status messages and checking results. At a corporate management level they are used for working towards and validating far-reaching decisions that increase the importance of the production environment. Each department and each division has its own individual key performance indicators, and more and more frequently, correlating these different KPIs to arrive at a meaningful overview presents a challenge.

As a rule, key performance indicators from the fields of quality, service and production are compared and placed in context with one another. Key performance indicators must be defined in a clear, consistent way – it’s the only way to compare different areas with one another and to transfer successful outcomes to different areas or sites. As the degree of responsibility of every employee in a company increases, so too does the demand for KPIs to support the decision-making process with up-to-date information.

Collaborative environment

Increasing responsibility and global pressure demand that individual employees and departments work together as closely as possible. The next quantum leap in improving business processes can only be made if all the know-how within the company is utilized and a collaborative environment is created. This requires both a corporate culture that encourages the exchange of information and open discussion of key performance indicators and an IT structure and technology base that encourages a collaborative environment.

The example below clarifies the importance of inter-departmental cooperation.

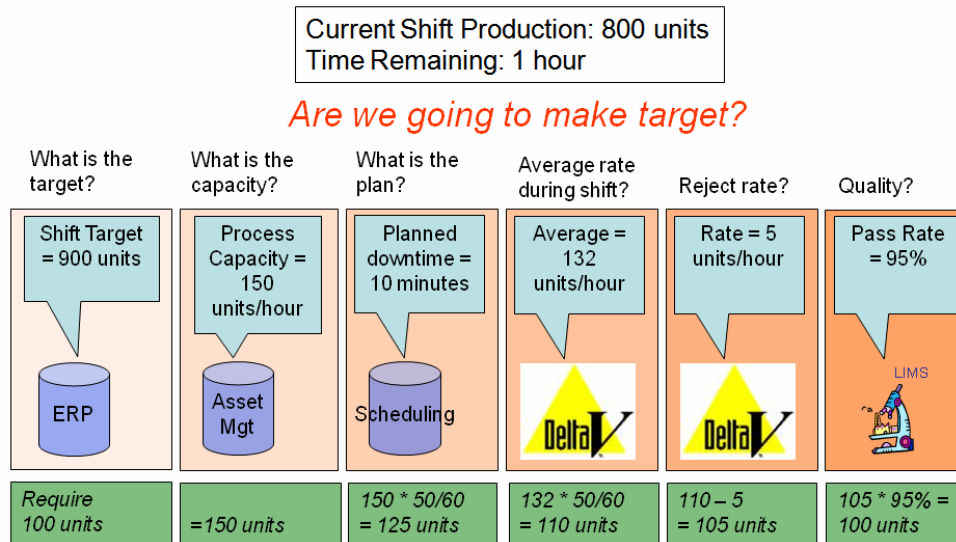


Fig.1

An hour before the end of a shift, workers ask themselves if it is still possible to achieve the set target, or whether any corrective action needs to be taken. The ERP and production systems indicate that 800 units have been produced so far out of the target total of 900 units. The issue now is whether or not it’s possible to produce the remaining 100 units in an hour. Only by correlating the different items of data and developing an automatic KPI system can the production manager see, at a glance and in real time, that he can achieve the planned target without changing anything – and what options he has in the event of problems.

An example from the steel industry

A good example of the benefits provided by a collaborative KPI system comes from the steel industry, in which production processes must be viewed through all stages in order to optimise the entire value process. Here, the KPI on the plant's operational effectiveness provides information on optimization potentials and utilization parameters. Throughput and quality are taken into account across all the process stages, from production through tempering. According to a study by A.T. Kearney [1], just by continuing to optimize existing plant utilization, the German steel industry should be able to boost its production volume by up to 20% while at the same time bringing processing costs down by around 12%.

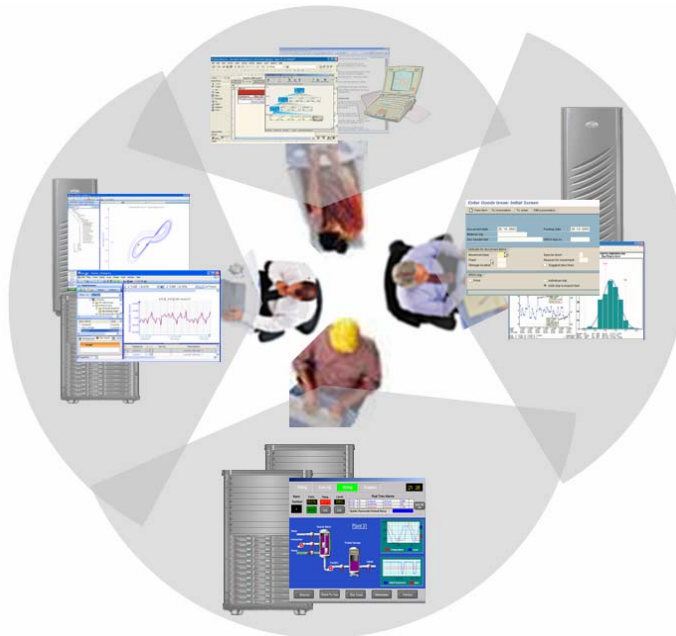


Fig.2

Normally one would survey the different systems and personnel from multiple departments to collect the requisite data from the information “silos” and correlate it to produce the necessary KPIs. This is necessary because the required data is not only stored in different systems and locations, but it’s also interpreted differently by users with different points of view (see Fig. 2). The only way to analyze the connections between the different KPIs swiftly and purposefully is to develop and deploy key performance indicator systems. Such a system enables different KPIs to be analyzed systematically and to be put into a meaningful context. However, an area as complex as production and the issues surrounding it are often difficult to integrate into an automated system like this, so many companies fall back on the use of manual records and correlations in order to determine key performance indicators for their production environment.

Companies often balk at the cost of integrating production systems with a KPI monitor system and creating a common KPI-based architecture for both non-financial and financial KPIs closely related to production. Here, in the context of lean management and the associated dismantling of hierarchical levels, the non-financial KPIs related to the individual production fields can be implemented and managed optimally.

Only factors which are monitored and evaluated constantly can be comprehensively analyzed in order to achieve continuous improvements. Thus, a key performance indicator must be up-to-date and available for rapid access. Gathering data manually from different sources of information is time-consuming and prone to error, which is why it's debatable whether KPIs can be determined correctly and their value retained for the decision-making process.

Excel as a reporting tool

Excel tables are often used for manual correlation. Although they do enable this kind of correlation to be performed, a downside is that they expose the fact that the company does not have an integrated, automated KPI monitoring system. Even if a lot of companies have invested heavily in integrating data sources and data warehouse solutions, Excel analyses are still frequently used since Excel does allow flexible reporting of all the required information – and more importantly, most users are familiar with Excel.

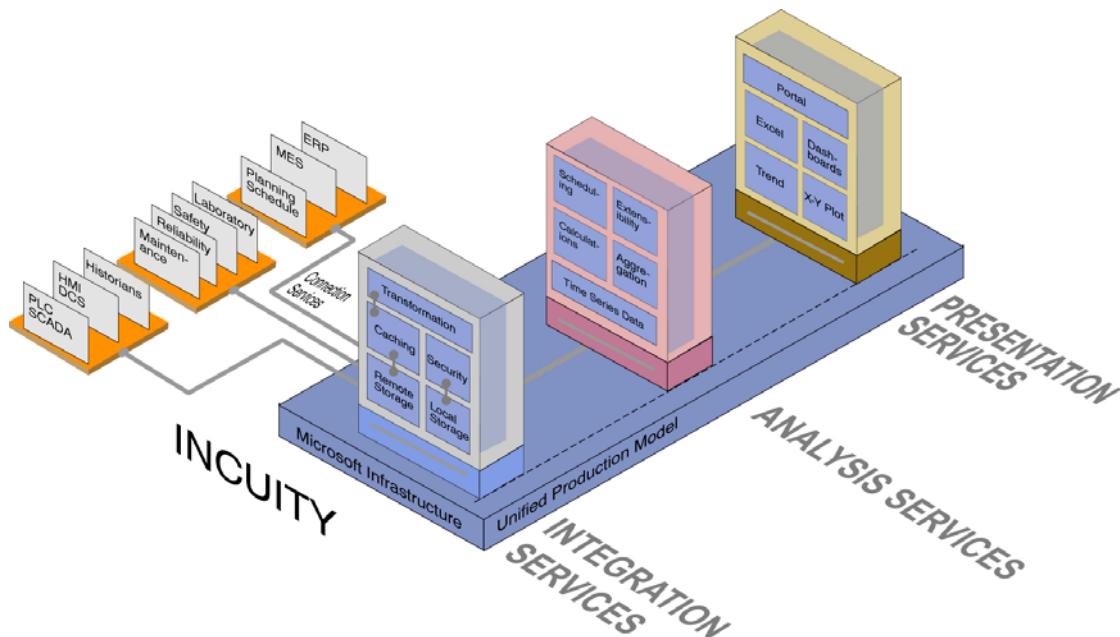


Fig.3 Integration and correlation of data from different Sources and application using the Unified Production Model

However, to produce KPI reports manually requires considerable time. It is often the department managers who face the never-ending task of compiling their key performance indicators and producing reports accordingly. Those companies whose structures have evolved over many years have recognized that when reporting is automated using Incuity [2], then personnel can concentrate their efforts on optimizing the process rather than being bogged down with time-consuming reporting.

When it starts producing reports automatically, Excel is close to being a business intelligence tool. Incuity's Unified Production Model, its system architecture and its web-based presentation services can integrate Excel into an automated KPI system, which in turn can itself be integrated with existing data-warehousing or business-intelligence solutions and with service-oriented architecture (SOA) concepts.

To drive process improvements forward based on KPIs, it is fundamentally important not only that the key performance indicator is available, but in the event of retrograde developments in the process, that the reason behind the change can be analyzed in a focused way. KPI systems must also support drill-down options and ad-hoc queries or quick analyses without any involvement of IT specialists.



Fig.4

The monitoring of corporate goals using measurable key values and key performance indicators can be carried simply by displaying specific KPIs. Each subdivision of a process in a company has corresponding sub-targets that should likewise be monitored and optimized again. The sub-targets, their measurement parameters and key performance indicators must be mutually compatible. If they're not, this can cause lengthy delays in preparation of reports that are outdated before they're available to employees. This in turn results in delayed responses, which can reduce the intended savings or cause process corrections to be carried out too late for producing meaningful results.

Using automated key performance indicator systems also enables development and support of so-called “goal-alignment models.” This also clarifies once more how important direct feedback and gathering of key performance indicators are in an automated system. This is where Incuity is especially valuable, offering users the opportunity not only to generate reports from a variety of sources, but also to integrate and correlate data from different applications and multiple existing databases and systems.

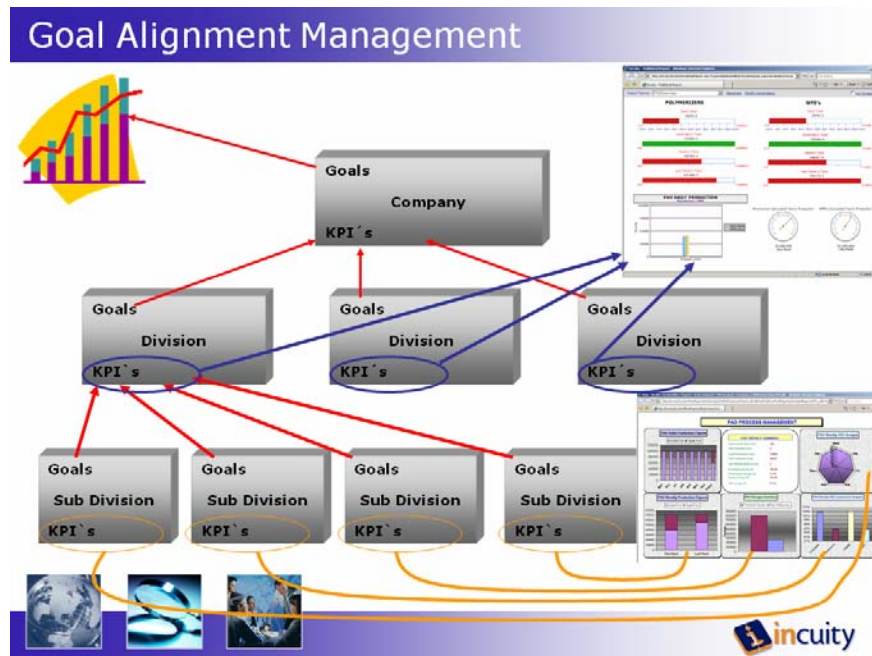
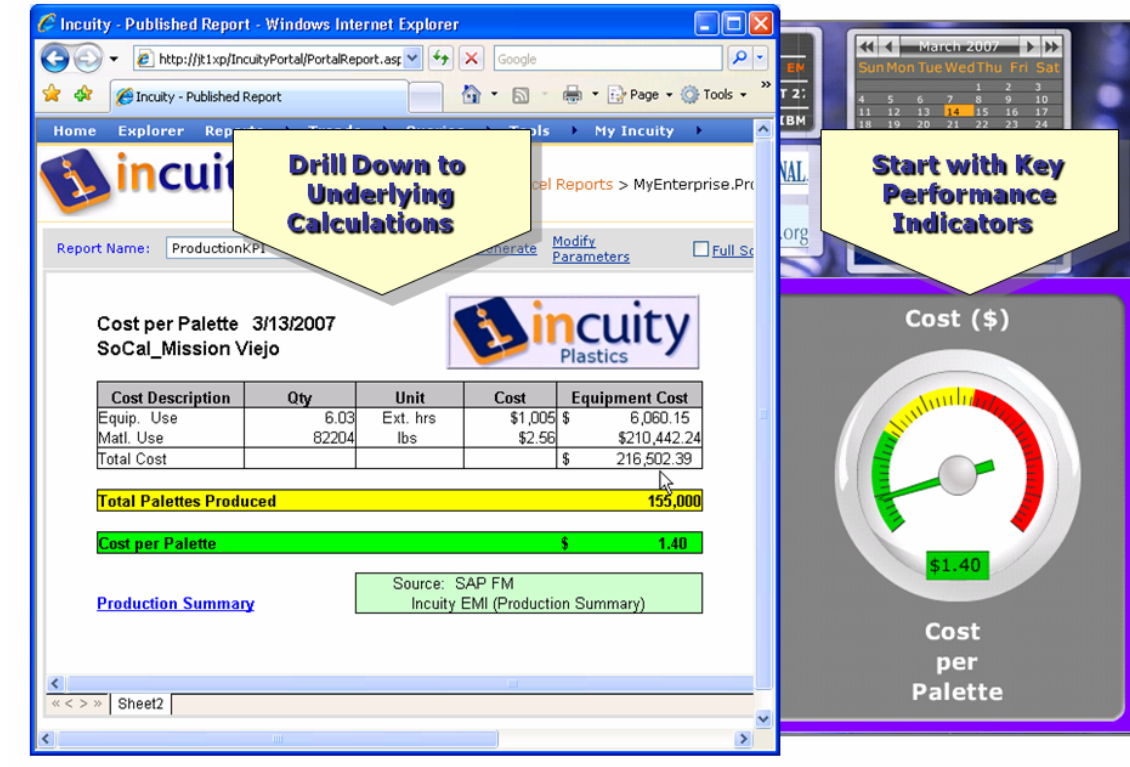


Fig.5 Goal Alignment Management

Incuity’s Unified Production Model abstracts the data, information and key performance indicators in a logical or physical model, thereby acting as a standardized integration, administration and migration system. Its dashboard, reporting and analysis facilities simultaneously echo the display level in an automated KPI system – with no need for data duplication. This allows users to analyze revenue, profit and costs for individual areas of the production environment, and to graphically display current production situations and any necessary responses in real time.

The continuous optimization of the supply chain can also be better integrated for added value. Here, too, the opportunity now exists to correlate transaction-oriented information from the classical supply chain with the time-oriented information from the production environment to obtain the required key performance indicators.



Return on Investment

There are many examples that illustrate the importance of defining KPIs for measuring return on investment. As one example, downtime reduction, better production planning and improved product quality have enabled one food processor to achieve savings of nearly \$2 million per year. This has been achieved through better integration of existing data and automatic correlation and analysis of it within a KPI system – and the company realized optimization opportunities that had previously gone unrecognized.

As another example, one pharmaceutical company achieved a 30 percent production increase plus a 20 percent reduction in product reject rates using Incuity as the heart of its KPI system. The annual saving amounts to more than \$2 million, made possible by the direct comparison of off-line quality data with the associated on-line production data by creating analytical connections within Incuity.

References

- [1] A.T. Kearney GmbH: www.atkearney.de
- [2] Incuity Systems GmbH: www.incuity.de
- [3] Heinze, R.: Business intelligence system for the manufacturing industry. openautomation 8 (2006) issue 5, pp. 10-13

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