Key Performance Indicators Metrics Effect on the Advancement and Sustainability of Knowledge Management

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Abstract: This paper addresses the relationship between the value of data and KPs as they relate to the sustainability of knowledge management (KM). Numerical data are compelling metrics to persuade executives and management in the organization of the significance of Knowledge Management. External statistics are usually less impactful than internal data. Nonetheless, and in the absence of internal data at the early phases of KM projects, many companies collect published data for comparable industries. In the present case, we compiled information from previous experiences of companies in the same line of business; therefore, management by-in was secured, and the KM project was, to some extent, successfully implemented. However, there was a need to generate in-house numbers to support promises and claims of KM benefits, and persuade all KM players from the technician to the organisation president; the ultimate objective is to have a sustainable Knowledge Management project across the organization, with visible, concrete, and quantifiable results. Equipped with the assertion “data is power”, Key Performance Indicators (KPIs) and other metrics were devised and integrated into our KM processes; these measurements are being pulled out systematically, and published to the whole audience. KPIs measured included the effect of KM on (i) customer satisfaction, (ii) business impact (i.e. savings), (iii) number of projects completed on time, (iv) and the number of technical reports generated per unit of research area. Over the past few years, the data we generated shows a considerable increase in customer satisfaction with our research and technical services; significant savings were obtained each year; project timely completion indicator rose to high levels as compared to previous yearly data; the electronic technical and scientific library experienced a build up of valuable know-how reports. Knowledge re-use as shown by reliance on internal resources was the standard and routine practice. On the other hand, many other qualitative observations, like effect on health, safety, and the environment are being quantified for inclusion in the KPI reporting. Based on the accumulated data, we believe that numerical values coupled with other tangible solid results will ensure a viable and sustainable KM in our organization. This hypothesis is supported by five year data and trend analysis. It confirms that internally generated statistics is a powerful tool to sway and re-assure the organization that KM can indeed increase efficiency, enhance customer satisfaction, and drive savings.

Keywords: KM, sustainable, metrics, data, KPI, statistics, know-how

1. Introduction

The changes in world economy led to fierce competition. To stay in business, companies need advanced technologies and innovation, and thus they turn to their Research and Development (R&D) departments (Kumpe and Bolwijn, 1994). R&D is capable of improving knowledge and its transformation into valuable output. Drongelen et al. (1996) reported that in R&D organizations, the largest part of knowledge is already available in explicit and tangible formats.

In R&D management literature, knowledge includes both information internalized in the organization, and could be new to some users, and information gained from outside, and it is completely new to all (Debackere et al., 1994; Johnson and Gibbons, 1975). In R&D environment, we already know that knowledge capture and dissemination happen spontaneously, but we believe that departmental barriers can hamper knowledge flow. Therefore, for a successful KM project, cross departmental linkage and building on existing practices are key success factors (Rabhi and Twalah, 2009 and 2010).

Both academia and industry have implemented a wide range of solutions to KM, including strategies, frameworks, processes, barriers and enablers, and IT tools; more importantly hey paid special attention to measurement indicators (Alavi and Dorothy, 1999; Lee and Hong, 2002; Edwards et al., 2003; Wong and Aspinwal, 2004). For example, high tech R&D organizations have three major elements of KM performance: (i) patent quality and quantity, (ii) R&D contribution to business, and (iii) R&D efficiency in process and product solutions (Woojong et al., 2004).

Earlier, we reported on the successful implementation of SABIC R&D Knowledge Management (KM) project (Rabhi and Twalah, 2009 and 2010). We also mentioned the various challenges; although, many of them were resolved, several will remain until suitable solutions are found. Some of these

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challenges include the internal metrics that can secure continuous support and appreciation for KM contribution to the corporate intelligence and memory, while meeting business objectives. Many attempts were made to develop framework for the creation of Key Performance indicators for KM solutions (Del-Rey-Chamorro et al., 2003). Others (Andone, 2009) tried to measure the performance of corporate knowledge management systems. The added value of knowledge management for financial performance of an East Asian conglomerate was proven and cleared documented (Sharma et al., 2007). A significant step in determining the business impact of knowledge management was achieved by Aaron (Aaron, 2009). The importance of KPIs led many KM researchers to believe that the future of Knowledge Management will depend on the value it creates (Vorakulpipat and Rezgui, 2008). This paper addresses the relationship between the value of data and KPIs to the sustainability of (KM); we hypothesize that generating internal positive statistics will increase adherence to the system, and ensure its continuous use. It proves that auto-generated internal data is a powerful tool to convince and re-assure the organization that KM can indeed increase efficiency, enhance customer satisfaction, and drive savings.

SABIC R&D KM SYSTEM: we previously described in details (Rabhi and Twalah, 2009 and 2010) the KM model and system for SABIC R&D. The major activities in our R&D environment were related to Basic Research, plant and business Technical Support (TSR), and continuous Learning. In this paper, we address solely KPIs as they relate to the “Technical Support” activity. Briefly, the TSR system methodically captures complete documentation for any technical project from creation to closure. It has a built-in electronic library that houses project plans, draft, and final reports; we referred to this as Technical Knowledge Base. At the completion of each project, a customer feedback document is logged; the request cannot be closed unless the feedback is submitted.

DESIGNING AND GENERATING KPI: in this KM system many indicators were considered for evaluation, and the most important ones based on feedback from engineers, scientists, and management were: (i) Customer Satisfaction, (ii) On-time completion of projects, which shows time-to-market ability, (iii) business impact, showing the effect of the system to save money to the company, and (iv) the total number of technical reports generated per year, showing accumulation of knowledge wealth over time. Statistical figures for these KPI are auto-generated and logged in the system. Every time a project is completed, the systems compares the planned and actual completion dates and decides whether the project is late or completed on-time. Business and technical staff agree on a business impact number for that specific technical project as it relates to the KM system. The customers fills a feedback form where they indicate clearly their level of satisfaction with the service and the value of the recommendations to the business. The KM system records automatically the number of technical reports, and archives them in a pre-designed taxonomy in the knowledge base. A survey is posted to all scientists and engineers enquiring about re-use of the knowledge accumulated in the database; this gives a clear indication about the usefulness of the system for researchers since re-use of existing captured knowledge will prevent “re-inventing the wheel”; which in turn will help speed up project completion, thus saving valuable time and cutting significantly project expenses.

2. Results and discussion

Prior to the TSR system implementation in 2006, data used to be saved in hard copies and stored in multiple distant geographic sites. It is thus difficult to use any of that data as a benchmark. Therefore, we will consider the year 2006 as the starting point to study and evaluate the various KPIs and how they can help the advancement and sustainability of SABIC R&D KM system.

Customer satisfaction: at the conclusion of each project the customers log their level of satisfaction with the R&D services; this includes understanding the (i) technical part, (ii) communication, and (iii) the added value of the recommendations; we report here the overall rating averaged over all projects completed in a given year. It is the first time this KPI is being captured and stored so that users as well as management can view it any point and study its change with time and across all sectors in the business. Figure 1 describes evolution of customer satisfaction over the last five years; it shows a steady improvement. Overall, it is always above the target level of 80% set by management in both requestor and service provider sides. This KPI had a positive effect on KM initiative; both users and management appreciated the value of data to make decisions and plan future actions. We believe this KPI will continue to help KM case, give it visibility and importance, and ensure its continuity. It is important that data accumulated over the next years continue to prove an increasing trend in gaining customer trust and satisfaction. For KM sustainability, and for the next three years, we do recommend to raise the bar for the target KPI to a new challenge of 85 or 90%.

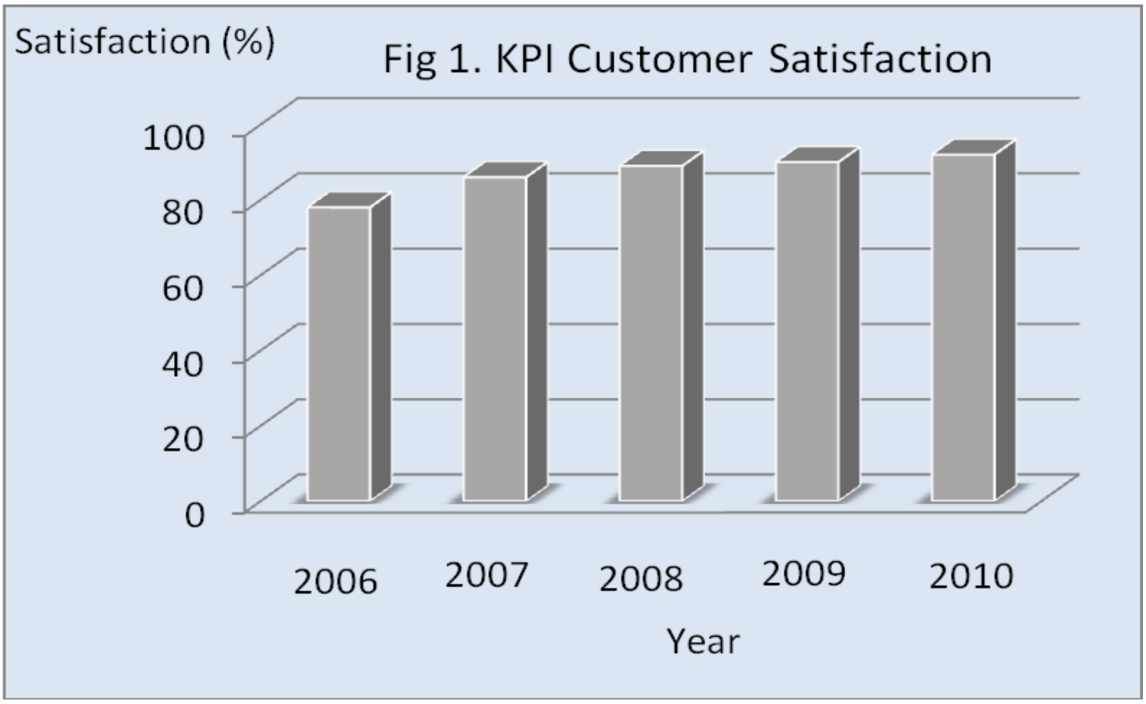

Figure 1: KPI customer satifaction

<u>Timely completion of projects</u>: Data for timely completion reflects the real challenges in meeting target dates; although shorter time-to-market is associated with higher business returns. Statistics show that, although increasing with time, all numbers are below the 80% target (Figure 2). This was viewed as a positive feedback: although projects get completed late, this KPI gave requestor, service providers, and management a clear indication of the problems, and helped them find the root cause. Cross functional teams were formed and worked to resolve and remove the bottlenecks. As a result, and although still shy of the target KPI, improvements over the years are clearly noticeable.

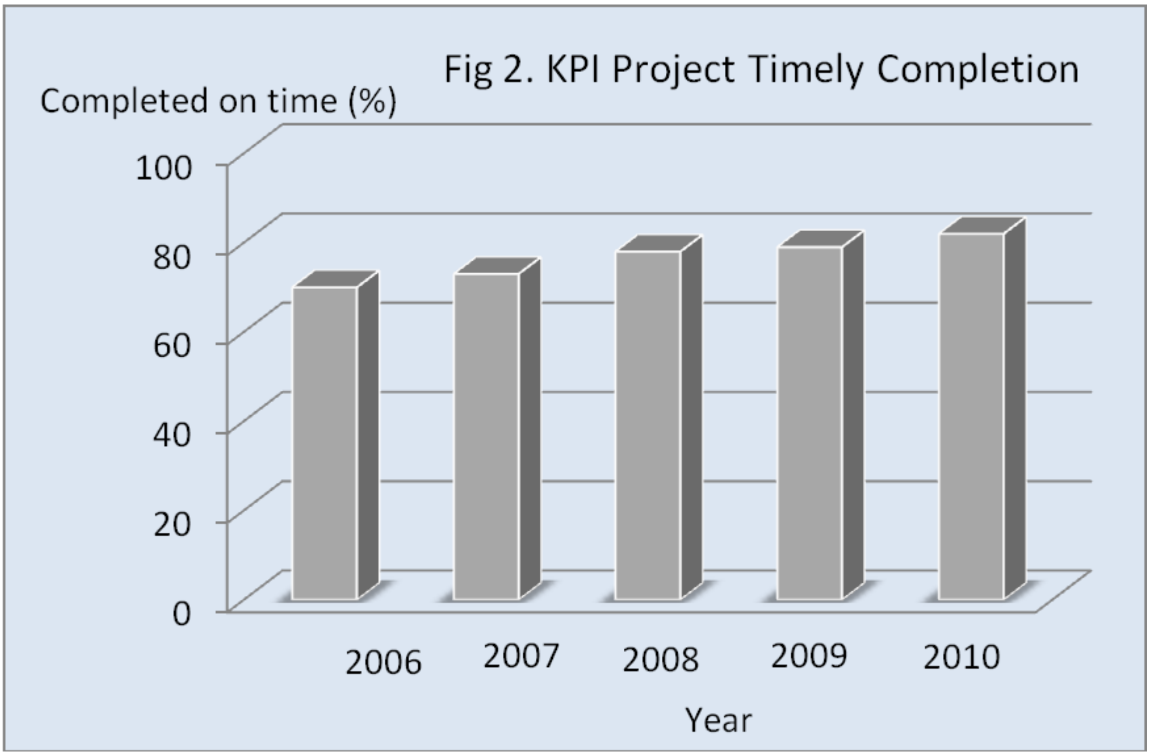

Figure 2: KPI project timely completion

<u>Business impact</u>: this is a very important KPI for the business, and if it is within management expectation, it can make up for shortfalls in all the other KPIs. Management gives it high importance and priority; actually it rewards teams with achievements that lead to considerable effect on the financial side of the business. Although started with modest figures in 2006, over the years, KPI data indicates significant increase and effect on the business (Figure 3), and therefore KM has an important effect on the way R&D runs its activities to drive high savings to the company

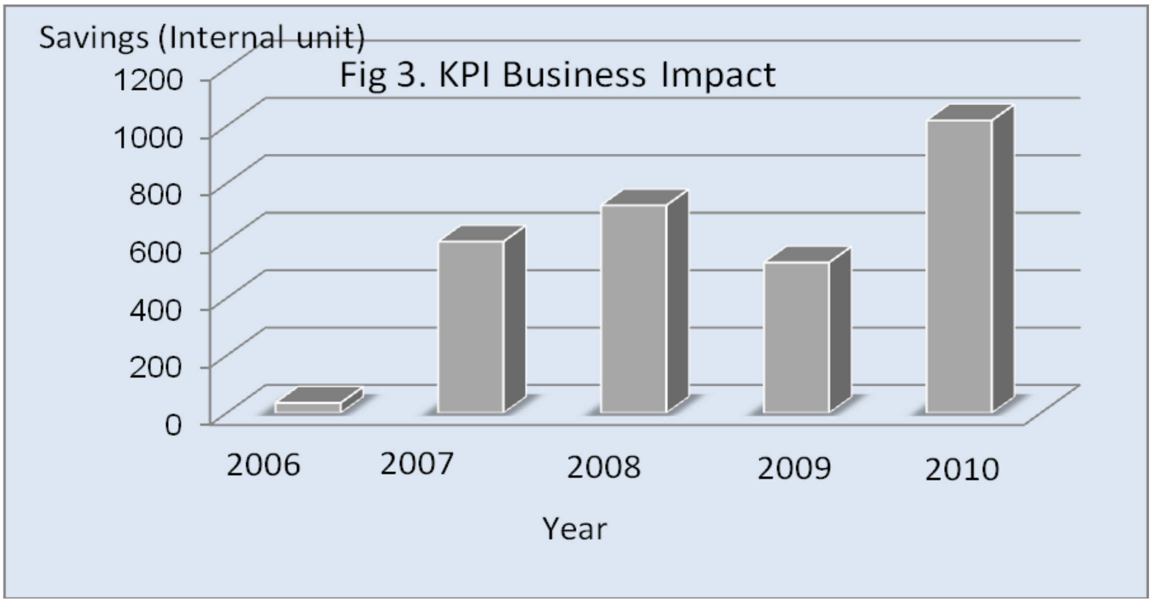

Figure 3: KPI business impact

<u>Knowledge base build up</u>: this KPI was simply measured by the number of final technical reports, which include recommendations, problems encountered, failure, success, learned lessons, etc. It measures the wealth, intelligence, and memory of the organization. Figure 4 shows the annual number of valuable documents captured and stored according to pre-designed taxonomy in our KM database. These documents have no value unless accessed and re-used in future projects. In our R&D case this will enable not only timely completion of the projects but also innovation and creativity (Woojong et al., 2004; Vorakulpipat and Rezgui, 2008). In the next paragraph, knowledge re-use will be described to this fact.

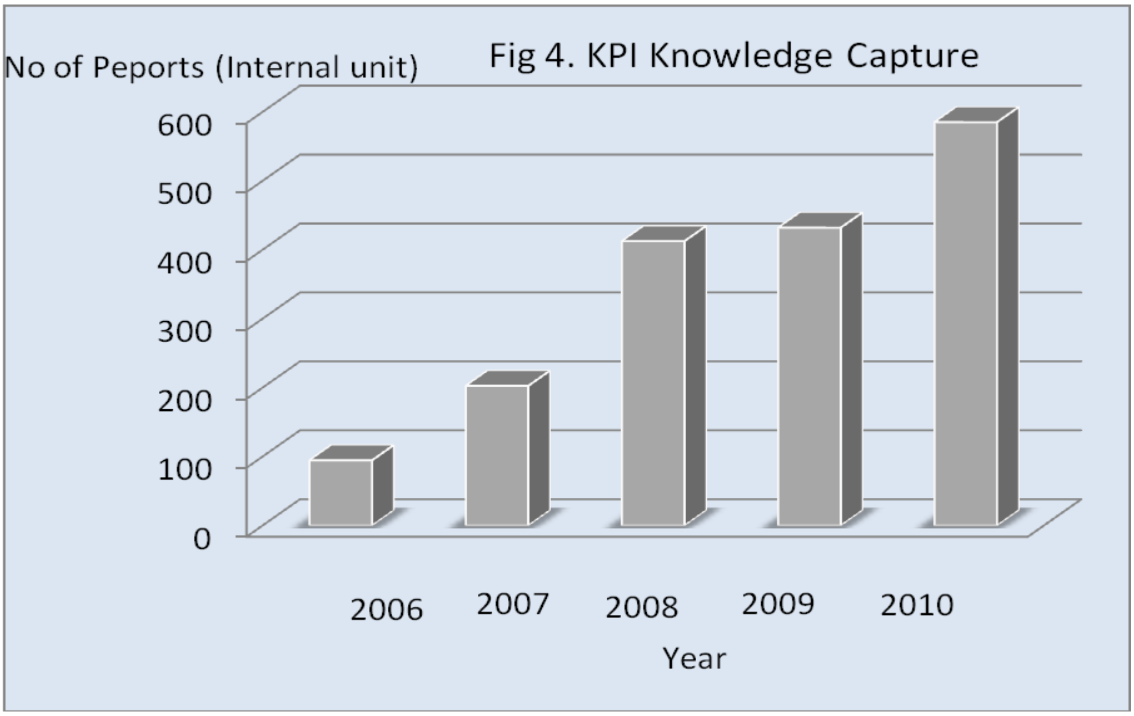

Figure 4: KPI knowledge capture

Knowledge re-use: A survey was designed to capture feedback from end users of the KM system. It was meant to evaluate the usefulness of this system to the knowledge creators and users. The survey asks both service requestors and service providers whether they consult the technical knowledge base before starting any new project; as a result, it enquires specifically about the extent to which the existing knowledge increased efficiency and reduced reliance on external knowledge. This is an indicator of how often we make use of our explicit knowledge; solving a problem by consulting existing knowledge can save time and help getting to the market fast; it also helps save money and reduce the risk of "re-inventing the wheel" (Johnson and Gibbons, 1975). Figures 5 a-c clearly illustrate how the researchers are making use of SABIC R&D accumulated knowledge. Seventy percent of the surveyed community ranked the KM system as very good to excellent in terms of streamlining work, increasing efficiency, and timely actions (Figure 5-b). Nearly 80% of the surveyed end users thought the system was great, and will continue to be useful for their work (Figure 5-b). More than half of the respondents judged the system very good to excellent in retrieving, sharing, and re-using the already gained corporate knowledge (Figure 5-c).

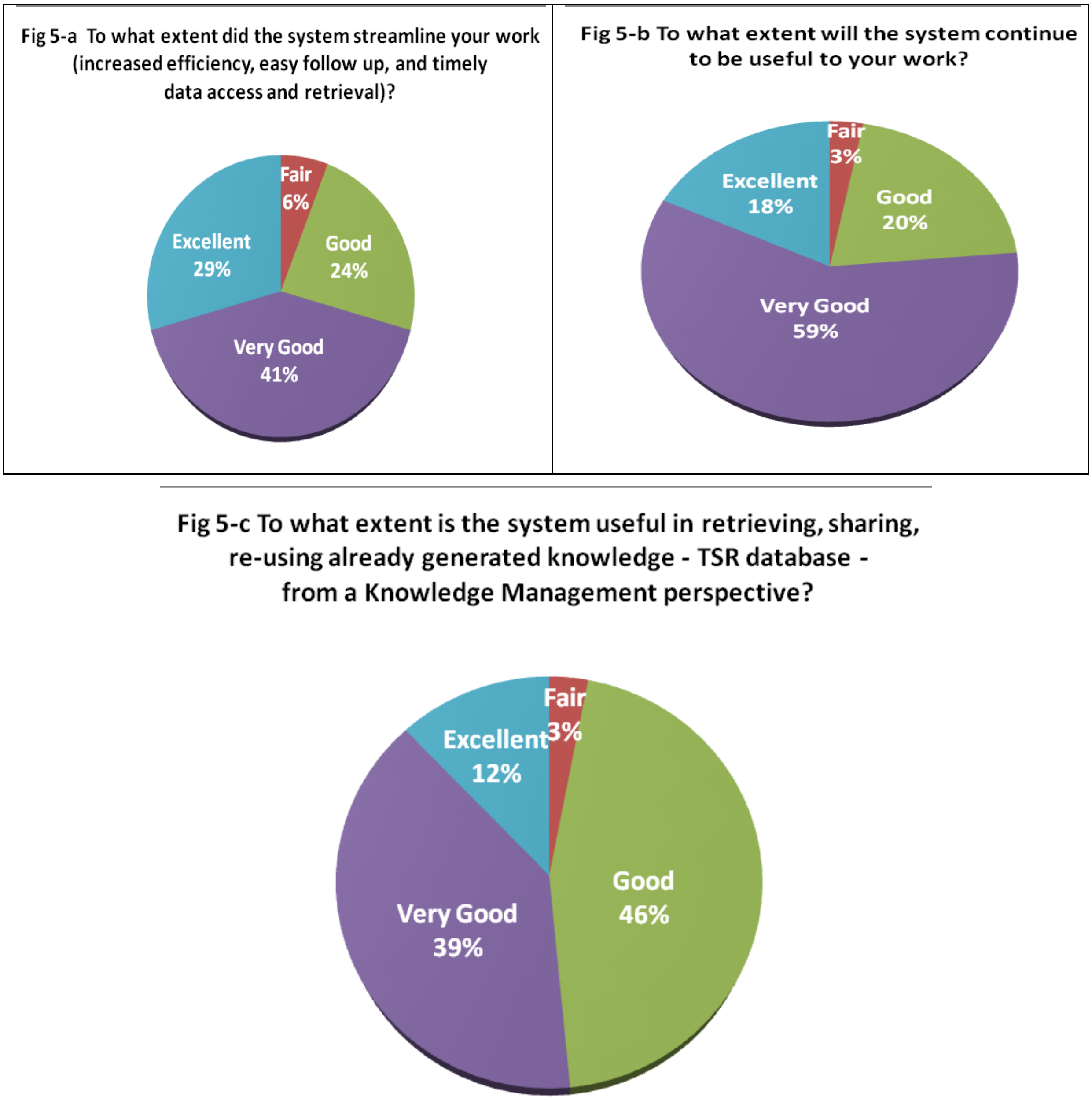

Figure 5 a-c: How are the employees making use of SABIC R&D accumulated knowledge?

3. Conclusion

SABIC R&D KM system was successfully implementing six years ago; solid statistical figures confirm there is a continuous need to generate internal data to support all the KM claims that were promised to management; it is an attempt to get durable support and commitment from all KM players, including the simple user and top management. The main aim is to have a sustainable Knowledge Management project across the organization, with visible, tangible, and measurable results. We report here that the designed and reported Key Performance Indicators (KPIs) were incorporated into the KM processes and systems ((i) customer satisfaction, (ii) business impact (i.e. savings), (iii) number of projects completed on time, (iv) and the number of technical reports generated); these metrics articulated in simple numerical data proved clearly to management that KM is important to business success, prosperity, and continuity. The data generated shows a significant increase in customer satisfaction; savings were recorded each year; project timely completion indicator compared to previous data continued to rise; the technical library was populated with valuable know-how reports, and accumulated know-how increased with the years. Knowledge re-use and users' reliance on internal knowhow was the standard and the usual practice. The numerical values reflected in the above KPIs will ensure a viable and sustainable KM in SABIC R&D.

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