

Measuring PMO Performance – Application of the Balanced Scorecard in a Collaborative Research Context

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Abstract: This article provides a discussion and analysis of the successful deployment by a university-based project management office (PMO) of the balanced scorecard as a performance measurement tool. The research study builds on a supporting literature review on the balanced scorecard along with background material on collaborative research projects. This is followed by a case study investigation of the design and implementation of the scorecard for a university PMO over a 4-year period. Various managerial insights have been generated that have value to project management professionals engaged in the roll-out of a performance measurement system to support the management of research projects. There is a need to carefully adapt scorecard metrics to the academic requirements regarding the management of a portfolio of research projects. Furthermore, although data collection is necessary for the sustained use of the scorecard to support team operations, it is also essential to consider the people or social dimensions when utilizing the scorecard approach. The article also includes specific details on how scorecard's key performance indicators have been derived through distilling strategic objectives into operational requirements.

Keywords: Project Management Office, PMO, Balanced Scorecard, Performance Measurement, University

Introduction

The PMO (project management office) is an organizational unit that is established in order to standardize how projects are managed and to secure efficiencies through generating best practices from the delivery of a portfolio of projects (Desouza and Evaristo, 2006). The PMO approach to project management has been deployed in different sectors, such as construction information systems (Ward and Daniel, 2013), the public sector (Esquierro et al., 2013), and research administration (Wedekind and Philbin, 2018). This is because many organizations increasingly deliver activities according to projects; indeed, projects as temporary organizations can be viewed as a production capability, as a unit for allocating resources to change initiatives, and as a unit for managing uncertainty (Turner and Müller, 2003). We can also consider that projects may be delivered for clients as part of funded contracts as well as there being internally commissioned projects, such as those associated with business and digital transformation. While projects and project management are highly prevalent in the modern organization, some projects continue to encounter difficulties, for instance, in the case of IT (information technology) projects (Nelson, 2007).

The project management office provides a mechanism to allow organizations to maximize the likelihood of project success. Furthermore, the PMO is able to develop project management best practices through the successive delivery of multiple projects. This knowledge can be augmented by various tools, techniques, and standard operating procedures that a PMO develops to support the project management community within the organization (do Valle et al., 2008). In regard to the positioning of a PMO, the Project Management Body of Knowledge (PMBOK®) has identified three different types of PMOs, which are supportive, controlling, and directive (PMI, 2013). Each of these types has a different level or extent of involvement in the delivery of project management within the organization, where supportive PMOs are more advisory in nature, controlling PMOs provide governance for projects, and directing PMOs provide both of these functions in addition to the provision of resourcing for the project management function. Moreover, Dai and Wells (2004) identified a set of standard features for a PMO, which are as follows: Developing and maintaining project management standards and methods; developing and maintaining project historical archives; providing project administrative support, providing human resource/staffing assistance, providing project management consulting and mentoring, and providing or arranging project management training.

Projects are traditionally delivered according to the so-called ‘iron triangle’, i.e. delivery of the project to meet the schedule, budget and specification criteria while achieving a required quality level (Atkinson, 1999), but the successful functioning of a PMO will rest on many factors. There is the ability of the PMO to secure new projects along with the various financial metrics associated with the development and subsequent delivery of a portfolio of projects; there are factors associated with the PMO resourcing, such as resource deployment and training; there are process and systems related factors, and there are yet further factors associated with the expectations of both internal and external stakeholders of the PMO. The adoption of an integrated performance measurement system should, therefore, be able to

accommodate a range of different factors, and in this context, the balanced scorecard is well suited to this application.

Collaborative research projects offer a number of benefits, such as enabling an exchange of knowledge between collaborators, increasing the scope and scale of data generated by research studies, and allowing access to complementary research infrastructure (such as experimental equipment and numerical models). However, there are also certain challenges associated with research collaborations (Cummings and Kiesler, 2005), and these include coordination costs, development of multidisciplinary teams, ensuring alignment of the collaborative partners, and generating the required level of impact from the project. Moreover, if collaborative research and technology projects are to generate potential solutions to address societal needs, across areas such as improved healthcare solutions, mitigating the effects of climate change and new forms of transportation, it is important that such projects can be managed to a high degree of success. This level of performance can be viewed in terms of achievement of the project milestones in the required timeframe and according to the quality, budget and schedule requirements, but the performance is also predicated on the research including the necessary creativity and scientific freedom to facilitate developments in the particular scientific or engineering discipline. In this context, it is important to have the necessary systems and processes to enable the effective performance measurement of research projects and especially in the case where a portfolio of projects is managed by a PMO.

This article includes details of an investigation into the use of the balanced scorecard to support performance measurement for a PMO focused on the delivery of a portfolio of collaborative research projects. The structure of the article is as follows. After the introduction, there is a literature review on the balanced scorecard, and this is followed by background material on collaborative research projects. This is followed by the method section and the results from a case study investigation of a university-based PMO, where the balanced scorecard has been successfully implemented and used to support operations over a four-year period. The case study includes a discussion of how the scorecard was designed from a strategic perspective and how it was deployed from an operational perspective. This is accompanied by lessons learned from the case, conclusions, and future work.

Literature review on the balanced scorecard

The balanced scorecard was originally developed to support the strategy development process and help organizations to measure business unit performance (Kaplan and Norton, 1996). The scorecard has four perspectives (namely financial, customer, internal business processes, and learning and growth), which provide a balanced view of the operating performance of a business unit along with the corresponding drivers contributing to future performance. A scorecard is a tool that offers a number of organizational benefits, and these can be summarised as follows: It provides a top-down perspective on an organization's mission and overall strategy; it captures current as well as future success and so is inherently forward-looking; it is broad-based through integrating both internal and external perspectives; it allows organizations

to focus only on the performance metrics that are the most important and have the highest priority (Kaplan and Norton, 1998).

A core feature of the scorecard is clearly the balanced approach – it seeks to move beyond the historical viewpoint of managing organizations through solely relying on tracking financial performance (Kaplan and Norton, 2001). Finances are, of course, necessary to all organizations – industrial companies need to make a profit from operations, and even charities need to generate revenues to cover operational costs and ideally make a surplus for reinvestment into the organization. The scorecard, therefore, links operational performance with both customer and financial performance, while capturing metrics on innovation, employee capabilities, technology, organizational learning, and customer success (Kaplan, 2009).

The balanced scorecard has been investigated and applied in many different organizational situations and applications including, for instance, the healthcare sector (Zelman et al., 2003), textile industry (Cebeci, 2009), the retail sector (Biggart et al., 2010), manufacturing (Fernandes, 2006), banking sector (Wu, 2012) as well as government and non-profit agencies (Niven, 2011). Despite such widespread investigation and usage of the tool to support a range of different types of organizations, there have also been issues raised about the scorecard. While Mooraj et al. (1999) have reported that the scorecard adds value through the provision of both relevant and balanced information in a concise manner for management, they also highlight that use of the scorecard is reliant on both formal and informal processes and they suggest that further research is required to understand the cost-benefit outcome for adoption of the scorecard.

Others argue that in the public healthcare sector while the scorecard can be adapted for strategic performance management purposes, it does not give sufficient weight to the political aspects and wider context for public sector organizations (Chang, 2007). It has also been pointed out that there have been numerous iterations of the scorecard over the last 20 years and that there is a need for an agreed taxonomy for such iterations, which would provide a comparison of the research findings (Perkins et al., 2014). Nevertheless, the balanced scorecard continues to be deployed in organizations to support performance measurement and advocated as a potential enabler for strategy implementation (Atkinson, 2006).

In regard to the higher education sector, there are a number of research studies that have examined the scope and application of the balanced scorecard (Lawrence and Sharma, 2002; Karathanos and Karathanos, 2005). The scorecard has been implemented as a tool for measuring the impact of industry-university collaborations (Al-Ashaab, 2011), where there is a need to ensure adequate measurement of the outputs of research and development (R&D) arising from collaborative research projects. The scorecard has been implemented to support the operational management of a university institute that also included a need for management of the university-industry interface in order to ensure the requirements of the institute funders were accommodated (Philbin, 2011).

Pertaining to the strategic context for higher education institutions, there is a need for such organizations to meet the stated missions by offering educational value to the students. This often has to be achieved while management processes are improved along with adequately

containing costs – moreover, universities need to effectively and efficiently use scarce resources, including intellectual capital, funding from government and other sources as well as people and the available time. The balanced scorecard has been described as a useful approach to help higher education institutions to operate in such an arena (Beard, 2009).

The utility of the scorecard has been explored as a strategic management tool to support performance evaluation to help the Taiwanese higher education sector to address the significant challenge in regard to supply and demand (Chen et al. 2006). In India, the scorecard has been found to provide higher education institutions with an opportunity to assemble a cascade of measures to translate the institution's mission of knowledge creation, sharing and utilization into a single framework that is comprehensive, coherent, communicable and mobilizing for institutional stakeholders (Umashankar and Dutta, 2007).

In terms of scorecard derivatives, it has been argued that the scorecard, which is a performance-oriented approach can be combined with a process-oriented approach (such as 'Hoshin Kanri') in order to create synergy and this has been examined in the context of an engineering management graduate programme at a higher education institution (Serdar Asan and Tanyaş, 2007). More broadly a strategy formulation framework for vocational education has been investigating through integrating the balanced scorecard with SWOT (strengths, weaknesses, opportunities, and threats) analysis, QFD (quality function deployment) methodology and MBNQA (Malcolm Baldrige National Quality Award) education criteria (Lee et al., 2000). These studies point to the extended utility of the scorecard and the potential for it to be integrated with other management support tools and processes.

In regard to the research reported herein, we have sought to recognize the merit of applying the scorecard as part of the management infrastructure to support the strategic orientation and operational delivery for a university-based PMO. Indeed, Kutsch et al. (2015) have used the scorecard as an analytical lens to focus on the contribution of the project management office through leading to an increase in project efficiency, reduction in project costs as well as improved success rates for project delivery.

Background on collaborative research projects

In terms of the broader context for collaborative research projects, there is an increasing trend towards research being collaborative in nature. Indeed, bibliometric research by Wuchty et al. (2007), which was based on an analysis of 19.9 million papers and 2.1 million patents over 5 decades, demonstrated that teams increasingly dominate solo authors in the production of knowledge (see **Table 1**).

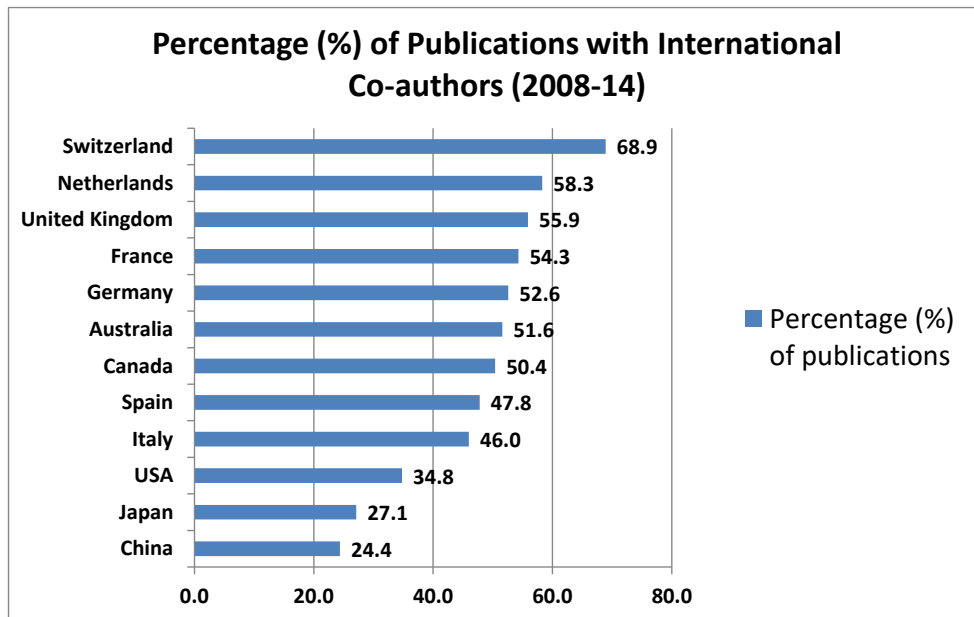
Table 1: Knowledge production patterns by academic field (source of data: Wuchty et al., 2007).

Fields	N_{fields}	Increasing team size		RTI > 1 (with self-citations)		RTI > 1 (no self-citations)	
		N_{fields}	%	N_{fields}	%	N_{fields}	%
Science & engineering	171	170	99.4	167	97.7	159	92.4
Social sciences	54	54	100.0	54	100.0	51	94.4
Arts & humanities	27	24	88.9	23	85.2	18	66.7
Patents	36	36	100.0	32	88.9	–	–

This large-scale study included ISI (Institute for Scientific Information) Web of Science data covering research publications from science and engineering since 1955, social sciences since 1956, arts and humanities since 1975, and the US-registered patents since 1975. In this regard, Table 2 highlights the number (N) and percentage (%) of the subfields that exhibit larger team sizes in the last 5 years compared to the first five years. The data was based on the relative team impact (RTI) for a given time period and field, where RTI is the mean number of citations obtained by team-authored work divided by the mean number of citations obtained by solo-authored work. The data highlights that in the case of no self-citations and for science and engineering, 99.4% of the 171 subfields have experienced increased levels of collaborative activity, with the corresponding figures for social sciences, arts & humanities, and patents being 100.0%, 88.9%, and 100.0%. Therefore, this data indicates that there is an increasing trend of scientific research studies being delivered by collaborative teams.

In regard to the trend towards international collaboration, we can consider data from the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 2015). **Figure 1** provides data on the percentage (%) of publications with international co-authors from 2008-2014. The data is based on total publications across all major fields of science and is provided for the top 12 countries based on the total number of international publications. This highlights, for instance, that 55.9% of scientific publications from the United Kingdom (UK) involve international co-authors, while the figures for the USA and Japan are 34.8% and 27.1%, respectively. Although there are variations between countries, it is evident that international research collaboration is a major feature associated with modern science and technology.

Figure 1: Level of international co-authored publications per country (source of data: UNESCO, 2015).



Focusing on the case for collaborative research projects, a number of benefits for the researchers involved have been identified, and this includes researchers based at higher education institutions as well as those at other organizations, such as government labs, research institutes, and industrial companies. These benefits have been assembled based on the authors’ experience in managing collaborative research projects over the past 20 years and are summarized in **Table 2**.

Table 2: Benefits for collaborative research (source: author’s experience).

Benefits for conducting collaborative research projects
<ul style="list-style-type: none"> • Enable researchers to work together in order to complement their skills and knowledge. • Allow the exchange of information and knowledge between collaborators. • Enable multidisciplinary research studies to address major technical challenges, e.g. societal, industrial, or academic challenges. • Provide access to specialized equipment, numerical models or other research infrastructure. • Support the expansion of the field of data available for research studies. • Provide scope to explore joint publishing opportunities. • Support researcher mobility between institutions. • Help secure research funding designated for supporting collaborative projects.

While there are compelling reasons to undertake collaborative research projects, there are also certain challenges associated with managing such projects. These challenges can be articulated in terms of the technical, commercial, and people-based (or social) aspects of the projects. **Table 3** provides a summary of the challenges for managing collaborative research projects, and these insights are based on the authors’ experience in this area. In the context of both the benefits as well as challenges for managing collaborative research projects, it can be observed that the PMO is an ideal supporting mechanism to enable the delivery of a portfolio of research projects. Moreover, it is important to implement an effective performance measurement system for the PMO, and the balanced scorecard is well suited to this application.

Table 3: Challenges for collaborative research projects (source: author's experience).

Technical	Commercial	People (social)
<ul style="list-style-type: none"> • Availability of research resources (staff, facilities, materials). • Maintaining research quality while meeting project requirements (schedule, cost, quality). • Generating sufficient 'impact' over the required timeframe. • Inadequate planning of technical aspects of the project. • Ensuring alignment with industry needs (in regard to products and services). 	<ul style="list-style-type: none"> • Availability of funding (industry, government, or other). • Ensuring financial costing captures all the project costs. • Lack of a robust business case to support the project. • Flexibility in commercial arrangements, e.g. for IPR (intellectual property rights). • Other legal matters, especially for international contracts. 	<ul style="list-style-type: none"> • Managing contributions from multiple partners. • Managing delivery across international borders, different languages, and cultures. • Insufficient leadership of the project, either academic or commercial. • Establishing effective multidisciplinary teams. • Maintaining regular and open communications with partners.

Method

The method employed in the research study is based on a case study investigation (see **Figure 2**). The method involves three main stages, namely literature review and background, case study investigation, and deductive reasoning. A process of reflective analysis (Schön, 1987) was employed to ascertain how the scorecard was designed and implemented at a university-based PMO in the United Kingdom. The method also involves a process of deductive reasoning (Johnson-Laird et al., 2017) in order to derive the findings from the case study that are structured according to three main areas, namely strategic perspective – design of the scorecard (1), operational perspective – deployment of the scorecard (2), and lessons learned from the case (3).

The authors were responsible for the direction and operational management of the PMO team, and the scorecard was utilized over a 4-year period (2014 to 2018), and this involved production of a scorecard report on a monthly basis and consequently 48 successive monthly reports were generated. The scorecard reports were used to implement the strategic objectives for the PMO and support the operational delivery of a substantial portfolio of collaborative research projects.

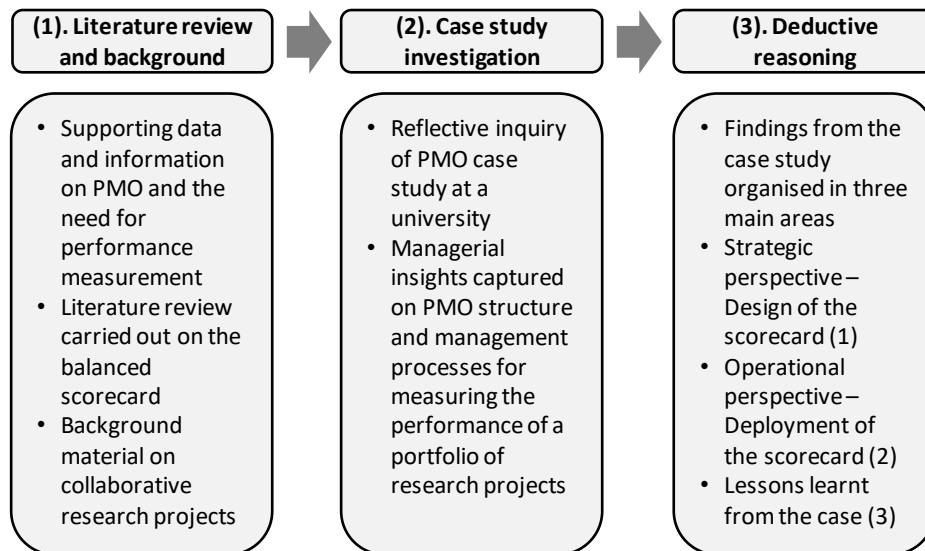


Figure 2: Research methodology employed in the study.

Case study investigation

The PMO featured in the case study was established with a mission to provide high-quality project management services to academic teams at the university engaged in the delivery of collaborative projects. The projects were funded from a range of different sources, including the European Commission’s Horizon 2020 programme (European Commission, 2019), as well as other international organizations engaged in collaborative funding projects. The PMO team provided a range of integrated services to support the academic units at the university, and this included consortium management, project management, and commercial services as the primary capabilities alongside a distinct focus on process and systems management. **Figure 3** provides a schematic view of the core capabilities of the PMO.

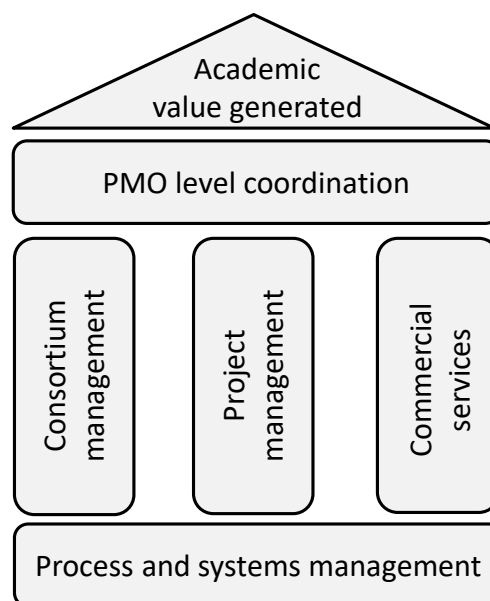


Figure 3: Schematic view of the core capabilities of the PMO.

The PMO provided both coordination and oversight of research projects that were ultimately driven by the need to deliver academic value across the university. Furthermore, the PMO adopted a series of management processes that were geared towards the needs of academic teams engaged in the delivery of collaborative research projects. The structures and processes of the PMO team were designed according to recognized best practices for project management to ensure that benefits were realized and project risks were properly managed (Office of Government Commerce, 2002).

The PMO supported academic teams across the university to deliver two main types of technical projects; these were European Commission-funded consortium projects and academic-driven commercial projects. Both of these types of projects directly underpinned the achievement of the university's organizational strategy. Moreover, it was important that the PMO's scope of activities and projects are strongly aligned with the strategic direction of the university. This alignment and positioning of the PMO, as well as the two main types of projects supported, is conceptualized in the strategy diagram in **Figure 4**.

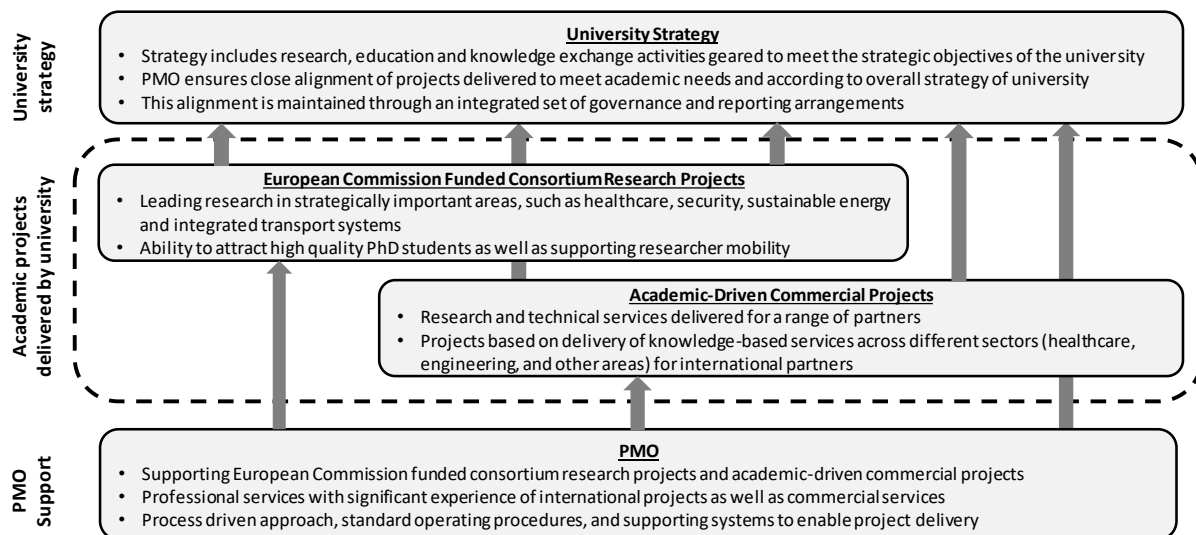


Figure 4: Strategic alignment of the PMO and projects supported.

The resources available to the PMO include staff and non-staff areas as part of a clearly defined organizational structure. The PMO team included a team leader (PMO director), operations manager, project managers, the back-office administrative team as well as other specialists, such as contracts manager. The team worked together to enable support to be provided to the two main types of projects and in accordance with the PMO level strategy that is closely aligned with the university's organizational level strategy. The team included the required levels of experience and knowledge to ensure high-quality project management is available, and this includes the necessary project management certification (namely the European PRINCE2 standard) held by team members. As mentioned previously, the PMO provided project management for two types of projects, and it is useful to provide further details on these projects (see **Table 4**).

Table 4: Features and details of project types supported by the PMO.

Project type	Project features	Sector/areas	Project outputs	PMO services
Consortium research projects	Projects involve a number of consortium partners (universities, research institutes, and companies) working together, typically over 4-5 years to achieve a series of research goals.	Projects across various aspects of healthcare, including pediatrics and other areas (low TRL). Also, engineering projects involving the development of new technologies (higher TRL).	Research outputs, including PhDs, graduated, publications, papers, etc. The impact generated across societal aspects (improved healthcare), industrial development and economic outputs.	Provision of project management for the overall consortium, managing project delivery and periodic reporting, communication and knowledge dissemination activities.
Academic-driven commercial projects	Projects involve the delivery of technical services for partners based on knowledge-driven activities, such as analysis, advisory services, and testing.	Projects are across healthcare and engineering sectors, typically at a high TRL level in most cases.	Knowledge-exchange with commercial partners, capacity building with international partners, improved technical capacity and knowledge provision.	Provision of project management, including tracking deliverables and milestones. Also, commercial and financial administration activities.

As can be observed, the two main types of projects have different features and characteristics. The consortium projects were research-based, with much of the project management being focused on supporting the delivery of consortium activities across the various partners. The projects included fundamental research at a lower TRL (technology readiness level), such as TRL1-2, as well as technology development projects with a mid-level TRL of 3-4. Conversely, the academic-driven commercial projects were typically at the higher TRL level of 5-6. For further information on the use of technology readiness levels to characterize research at the different stages of development, see the work of Mankins (2009). Also, the commercial projects involved the delivery of various knowledge-based services, such as technical analysis, advice, and testing. Both types of projects were supported by project management delivered by the PMO, although the emphasis of the management support varies and was tailored according to the needs of the project and the academic team. In the case of the consortium projects, the project management was focused on supporting the project's PI (principal investigator) to deliver the research objectives across the consortium of partners. Conversely, in the case of the commercial projects, the project management included traditional management of deliverables and milestones combined with commercial services, including contractual and financial administration.

Delivery of the project portfolio was based on the provision of project management across the full project lifecycle, including supporting pre-award (proposal development) and post-award (project delivery) activities. The delivery of high-quality support to academic teams requires

close working with other professional services teams at the university as well as providing close support to the principal investigators. This work was supported by internal communications (including in-reach events, workshops, and other activities) as well as external communications (including the use of social media and websites). Adoption of an integrated communication strategy, therefore, supports the development of new projects, maintaining the project portfolio, and helping to underpin the financial sustainability of the PMO team. Moreover, the project portfolio was delivered through a series of tailored management processes designed to ensure projects are properly controlled, and progress is monitored through project and team level reports (including use of key performance indicators and the balanced scorecard). The provision of high-quality project management (as evidenced by academic and customer level feedback as well as achievement of project objectives) was also dependent on access to the necessary management tools, standard operating procedures (SOPs), and systems including appropriate ICT (information and communications technology) infrastructure.

Discussion of the case

Strategic perspective – Design of the scorecard

The scorecard used by the PMO team was designed to enable the PMO to deliver its strategic objective of providing high-quality proposal and project management support to academic teams involved in the proposal writing and delivery of collaborative research projects across the university. The PMO was responsible for ensuring that projects were delivered according to the budget, schedule, and scope as well as quality requirements. This involved a series of project management tasks focused on the planning, organizing, controlling and monitoring of activities for collaborative research projects. Consequently, commercial project management practices were required to support this process but the PMO was operating in a university (i.e. non-profit) environment, and therefore care was needed in how commercial approaches were adopted as a university should be focused on knowledge creation and sharing as a primary driver and not the generation of commercial benefits.

In order to provide clarity on the strategy formulation process for the PMO and how this relates to the four perspectives of the balanced scorecard, **Figure 5** illustrates the cause-and-effect links for the PMO team, adapted from Mooraj et al. (1999, p. 483). This diagram translates the strategy and objectives of the PMO team into broad areas of requirements for the scorecard according to the four specified perspectives. This approach also highlights the interconnectivity between these broad areas and how the different perspectives are aligned to support the achievement of strategy through the eventual achievement of financial performance by the PMO. In order to give clarity on the scorecard metrics for the university-based PMO, **Table 5** provides more detailed requirements along with definitions, according to Kaplan and Norton (1996, p. 54).

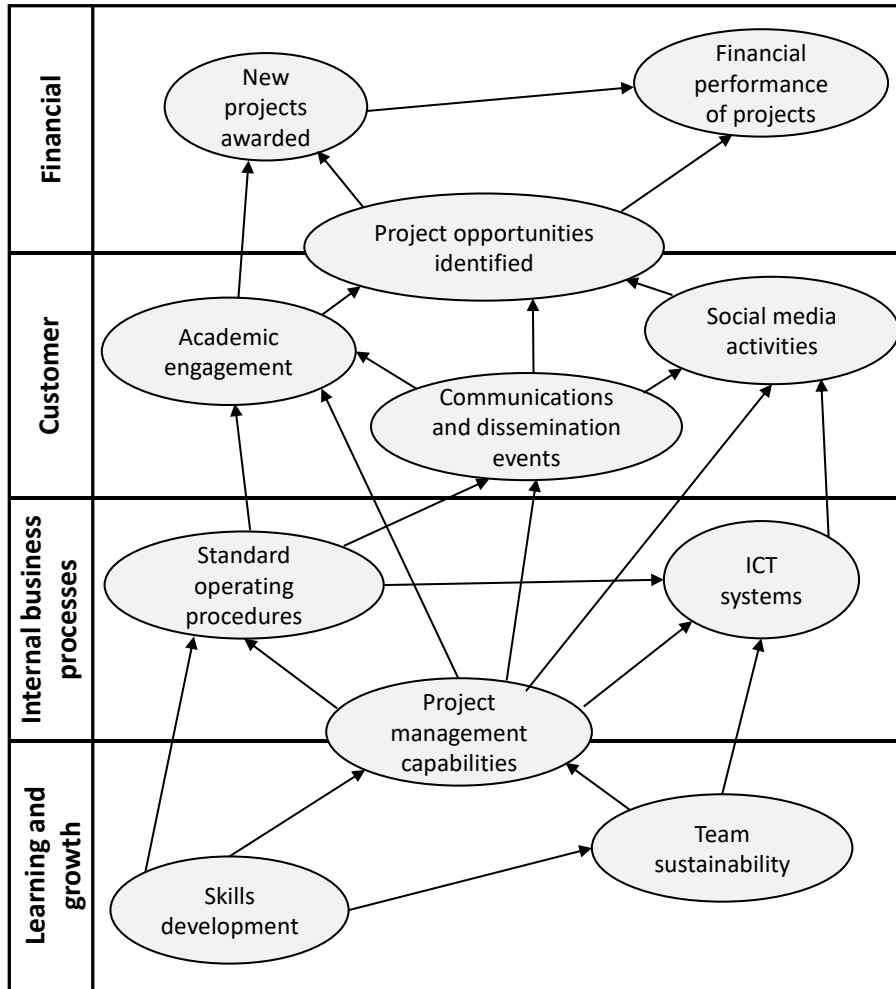


Figure 5: Cause-and-effect links for the PMO team according to the scorecard perspectives, adapted from Mooraj et al. (1999, p. 483).

Perspective	Definition	Requirements for scorecard metrics
Financial	<i>“To succeed financially, how should we appear to our shareholders?”</i>	<ul style="list-style-type: none"> • There is a need to monitor the performance of the PMO team regarding the financial value of proposals submitted and awarded. • Other financial areas to be considered include outstanding debt levels on projects as well as the value of charges against PMO managed projects.
Customer	<i>“To achieve our vision, how should we appear to our customers?”</i>	<ul style="list-style-type: none"> • There is a need to monitor the level of engagement of the PMO team with the ‘internal customer base,’ which is the academic community. • Other areas include the number of new projects that have been initiated with external customers as well as communications and social media activities with stakeholders.

Internal business processes	<i>“To satisfy our shareholders and customers, what business processes must we excel at?”</i>	<ul style="list-style-type: none"> • There is a need to monitor the performance of the PMO team regarding the development of new processes and procedures as part of capturing best practices for project management and other functional areas. • Other areas include the use of new ICT systems by the PMO team to support efficiency improvements.
Learning and growth	<i>“To achieve our vision, how will we sustain our ability to change and improve?”</i>	<ul style="list-style-type: none"> • There is a need to monitor the performance of the PMO team regarding the level of training undertaken across the whole team. • Other areas include the need to measure the number of external presentations given by team members as part of their professional development.

Table 5: Requirements for scorecard metrics, with definitions according to Kaplan and Norton (1996, p. 54).

These requirements can be further refined to provide a specific set of key performance indicators that were part of the scorecard. Consequently, **Table 6** provides a summary of the balanced scorecard developed to support the university PMO and the 15 KPIs across the four perspectives. This set of KPIs was carefully assembled to reflect the relative areas of ‘performance concentration’ according to the strategy and objectives of the PMO team. It can be observed that the scorecard includes an uneven number of KPIs across the four perspectives, which reflects there is a greater concentration of performance in the financial perspective (6 KPIs) and customer perspective (5 KPIs) when compared to the internal business processes perspective (2 KPIs), and learning and growth perspective (2 KPIs). However, this does not mean that monitoring the performance of the team in these latter two perspectives is a lower priority than the former two perspectives, but rather it is a reflection of the concentration and number of areas that need to be measured to properly monitor and control the performance of the team. Conversely, implementation of the scorecard for another team in a different organizational scenario may result in a different set of KPIs with a corresponding different level of performance concentration across the four perspectives.

Perspective	KPI	Description	Comments
Financial	01	Value of proposals submitted to funding bodies.	<ul style="list-style-type: none"> • This is the financial value (£) of proposals submitted to funding bodies during the month. • The financial value (£) is tracked against an annual target.
	02	Value (consortium) of new projects awarded.	<ul style="list-style-type: none"> • This is the financial value (£) of new projects awarded (based on the university and collaborative partner allocations) during the month.

			<ul style="list-style-type: none"> The financial value (£) is tracked against an annual target.
	03	Value (institutional) of new projects awarded.	<ul style="list-style-type: none"> This is the financial value (£) of new projects awarded (based on the allocation for the university only) during the month. The financial value (£) is tracked against an annual target.
	04	Value (team) of new projects awarded.	<ul style="list-style-type: none"> This is the financial value (£) of new projects awarded during the month. The financial value (£) is tracked against an annual target.
	05	Value of staff charges to PMO managed projects.	<ul style="list-style-type: none"> This is the financial value (£) of staff charges (or bookings) made to PMO managed projects during the month. The financial value (£) is tracked against an annual target.
	06	Value of past due to receivables on PMO managed projects.	<ul style="list-style-type: none"> This is the financial value (£) of outstanding debt from customers on PMO managed projects during the month. The financial value (£) is tracked against an annual target.
Customer	07	The number of university academics supported by the PMO team on proposals (pre-award).	<ul style="list-style-type: none"> This is the number of academic members of staff (principal investigators and co-investigators) that are engaged in the development of proposals and negotiation of contracts during the month. The number of academics is tracked against an annual target.
	08	The number of university academics supported by the PMO team on projects (post-award).	<ul style="list-style-type: none"> This is the number of academic members of staff (principal investigators and co-investigators) that are engaged in the delivery of projects during the month. The number of academics is tracked against an annual target.
	09	The number of new projects initiated by the PMO team.	<ul style="list-style-type: none"> This is the number of new projects that have been initiated during the month. The number of projects is tracked against an annual target.
	10	The number of events and communications activities delivered by the PMO team to	<ul style="list-style-type: none"> This is the number of events, such as workshops and other significant communications activities that were

		grow project management engagement.	<p>delivered by the PMO team during the month.</p> <ul style="list-style-type: none"> The number of events and communications activities is tracked against an annual target.
	11	Level of social media activity to raise the profile of PMO both internally and externally.	<ul style="list-style-type: none"> This is the cumulative number of followers on the PMO team's social media sites. No annual target is set for this KPI.
Internal business processes	12	The number of new PMO processes captured, documented, and disseminated.	<ul style="list-style-type: none"> This is the number of new standard operating procedures (SOPs) issued by the PMO team during the month. The number of SOPs is tracked against an annual target.
	13	Level of ICT system used to improve efficiency and effectiveness across PMO projects.	<ul style="list-style-type: none"> This is a qualitative assessment in regard to the adoption and deployment of new ICT systems to support PMO operations during the month. No annual target is set for this KPI.
Learning and growth	14	Level of training carried out by team members to grow the skills-base and intellect of the PMO team.	<ul style="list-style-type: none"> This is the number of days of training undertaken by PMO team members during the month. The number of training days is tracked against an annual target.
	15	The number of external presentations delivered by PMO team members at project meetings, conferences, and external events.	<ul style="list-style-type: none"> This is the number of external presentations delivered by PMO team members at project meetings, conferences, and external events during the month. The number of external presentations is tracked against an annual target.

Table 6: Summary of balanced scorecard and KPIs developed to support the university PMO.

Operational perspective – Deployment of the scorecard

In terms of the operational use of the scorecard, the data for the KPIs were gathered on a monthly basis to summarise the performance of the team for the previous month. Data was assembled every month through coordinating the contributions from project managers in the PMO team and also through interrogation of a number of ICT (information and communications technology) systems, including the university's ERP system (enterprise resource planning), CRM (customer relationship management) system, project management system as well as local records held in spreadsheets. Consequently, there was a certain administrative requirement associated with operating the scorecard. Initially, when the

scorecard was adopted, an investigation was carried out over whether the scorecard KPIs could be integrated into one of the existing corporate ICT systems with an automatic generation of the required KPI data every month. While this would have understandably reduced the administrative effort required, it was deemed to be excessively costly to undertake the required systems integration work. Therefore, it was decided to operate the scorecard through a spreadsheet template that was populated with data every month. This also had the benefit of being readily accessible to all of the team members and still allowed all the KPIs and monthly updates to be available on a single screenshot view.

Each month and once the scorecard had been assembled, it was forwarded to the divisional director in order to ensure effective oversight and governance of the PMO team. The scorecard and the performance of the team according to the specific KPIs were also displayed and discussed at the monthly PMO team meeting. At the end of each academic year, the performance of the team against the annual KPI targets was also identified, and this information was shared across the team and with senior management. Additionally, the scorecard KPIs were reviewed on an annual basis to ensure they were still aligned to the team strategy and objectives; where required, adjustments were made both to the KPIs themselves and also to the annual numerical targets.

Lessons learned from the case

The following lessons have been learned through considering the findings from the case study investigation into how the balanced scorecard was deployed at a university-based PMO.

- The balanced nature of the scorecard provides an ideal mechanism to adopt a holistic view of the work and functioning of a PMO and the projects that are delivered, and this includes the project, process, and people considerations.
- The essential need for reporting financial metrics is highly consistent with the needs of a PMO to gather and report on the performance of projects, but this is augmented through also capturing KPIs from the other perspectives, i.e., customer, internal business processes, and learning and growth.
- The utility and benefits gained from using the scorecard to guide operations and track team performance need to be weighed against the administrative requirements for servicing the scorecard and gathering the required data. In the case study, monthly updates of the scorecard provided the optimal balance, but in other instances, the frequency could be different, such as weekly or quarterly (i.e., every three months).
- In the ideal situation, it is suggested that the scorecard should integrate with the main corporate IT systems that hold the data for the KPIs, such as the ERP, CRM, and project management systems. This integration was not possible in the case, and hence the data capture exercise did carry an administrative requirement. Conversely, where a 'low tech' option, such as gathering scorecard KPI data in a document table or spreadsheet, is required for a straightforward application, such an option can be readily adopted without the need for extensive systems integration activities. In such a scenario, more complex roll-outs of the scorecard can still be implemented in a phased approach as

and when the organization has the resources available for a more complex system, or when the circumstances of the team or organization have sufficiently changed.

- The team leader (or business unit leader) needs to be accountable for the performance of the scorecard KPIs, although responsibility for the performance of specific KPIs or groups of KPIs can be allocated (or delegated) to specific members of the team.
- Regular review of the scorecard and the performance of the KPIs with team members helps to focus the attention of the team and socialize any issues associated with underperformance in a particular area. This is important as it encourages discussion on corrective action within the team, and any actions required to address such underperformance can be shared across all the relevant team members. Team leaders need to guide this process, but team members also need to properly engage with the process and any follow-on activities. A further reflection is that the scorecard served as a motivation tool and helped ignite an element of healthy competition between the team members.
- Capturing data on learning and growth, such as training undertaken as well as presentations given by team members, helps, in particular, to further motivate team members. This is because an individual can clearly observe how their achievements and efforts are being recognized; conversely, it can also spur other team members on to undertake training or volunteer for an initiative or presentation that extends beyond their current role.
- Adopting the balanced scorecard in a sustainable manner requires the commitment of the team, and implicitly the team leader will need to drive forward both the development and delivery of the scorecard – a continuing focus is then required if the scorecard is to remain a part of the team's core management processes. Where possible, the use of the scorecard should be integrated with wider governance processes, such as those at the divisional and corporate levels.

Conclusions

This article has reported on the findings from a case study investigation into how the balanced scorecard was designed and deployed at a university PMO over a 4-year period. The application of the scorecard was to enable performance measurement for a substantial portfolio of collaborative research projects managed by a PMO team and working in conjunction with academic teams across the university. This research study provides a supporting literature review on the balanced scorecard along with accompanying background material on collaborative research projects, which illustrates the context for the study and helps underpin the need for the PMO in this project management application.

The balanced scorecard has been adopted widely over the last 20-25 years, and this has extended across different types of organizations and applications. The scorecard continues to be a powerful tool to help management track the performance of a team or business unit through reporting on the progress of the team to senior management and controlling the allocation of resources to ensure that progress is maintained. While there have been some authors that have

raised certain issues to be addressed in regard to the scorecard, the continued use of the scorecard as strategic development and operational management tool remains obvious. It is important though to properly adapt the scorecard to the specific organizational circumstances – this may result, for instance, is there is a higher concentration of KPIs in certain perspectives of the scorecard, but this is an essential feature of aligning the scorecard perspectives to the strategy for the business unit.

The design and operational use of the scorecard are very much associated with the collection of data and information, and in the case of a PMO, there is a need for a significant amount of data associated with project management. But in regard to the successful adoption of the scorecard, while such data collection is, of course, necessary, it is the people or social dimension that has a pivotal role to play in regard to the sustainable use of the scorecard over the medium-to-long term. As a further parallel, the use of the tool to monitor the performance of the team and subsequently control the allocation of resources across the team is a prerequisite use for the scorecard, but again from a ‘soft viewpoint,’ the scorecard can be equally valuable in regard to helping to motivate team members to maintain and even increase performance levels. The scorecard, therefore, provides benefits that extend beyond the initial performance measurement aspects into more fundamentally important areas relevant to the sustainability of the team or business unit.

In regard to future work, it is suggested that further longitudinal studies are undertaken on how the balanced scorecard has been adopted in different organizational settings over extended periods of time. This will provide greater insights into how the scorecard can be adapted for different applications and inform future areas of research.

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