

## Cost (Non)-Recovery by Platform Technology Facilities in the Bio21 Cluster

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Platform technologies (PT) are techniques or tools that enable a range of scientific investigations and are critical to today's advanced technology research environment. Once installed, they require specialized staff for their operations, who in turn, provide expertise to researchers in designing appropriate experiments. Through this pipeline, research outputs are raised to the benefit of the researcher and the host institution.<sup>1</sup> Platform facilities provide access to instrumentation and expertise for a wide range of users beyond the host institution, including other academic and industry users. To maximize the return on these substantial public investments, this wider access needs to be supported. The question of support and the mechanisms through which this occurs need to be established based on a greater understanding of how PT facilities operate. This investigation was aimed at understanding if and how platform facilities across the Bio21 Cluster meet operating costs. Our investigation found: 74% of platforms surveyed do not recover 100% of direct operating costs and are heavily subsidized by their home institution, which has a vested interest in maintaining the technology platform; platform managers play a major role in establishing the costs and pricing of the facility, normally in a collaborative process with a management committee or institutional accountant; and most facilities have a three-tier pricing structure recognizing internal academic, external academic, and commercial clients.

**KEY WORDS:** core facilities management, research cluster, biomedical

### INTRODUCTION

The Bio21 Cluster, a not-for-profit public company, is the facilitating body for a 21-member biomedical, health, and biotechnology research cluster in Melbourne, Australia. Comprising universities, tertiary health services, medical research institutes, Commonwealth Scientific and Industrial Research Organization, and other member-based organizations, it encompasses international strengths in biomedical research, healthcare, and education. The Bio21 Cluster facilitates collaborative projects and translational research, shared platform technologies (PT), business development, and education programs and advocates on behalf of all members.

Like many other research clusters, the Bio21 Cluster has important PTs. Initial funding for a PT usually supports purchase and installation but does not provide funds for operational costs in the long term. Sustaining the facility beyond the initial establishment period is a major and complex challenge. Although appropriate for some facilities, a simple and effective model is to set a fee structure that will cover all operating costs. In others, however, setting

higher fee structures to meet 100% of cost could be a disincentive to promoting innovative science and erects barriers to novel and opportunistic applications, which are the basis of developing an innovative research environment.<sup>1</sup> As such, mechanisms to support the sustainability of research platforms need to be investigated.

In 2008, the Bio21 Cluster initiated a program to identify the PTs across each of its member organizations.<sup>2</sup> The PT Network (PTN) currently comprises more than 50 substantial technology platforms that support a broad spectrum of expertise, facilitating basic discovery to data storage and management, drug optimization and formulation, biobanks, and clinical trials. The rationale behind creation of a network was to maximize investment in major infrastructure by increasing availability to academic and industry users; promote collaboration across platforms and minimize duplication of services; raise the profile of the platforms within the cluster and in Victoria; and coordinate planning for future major investments.

The state government of Victoria recognized the importance of the network to Victoria in the form of a 3-year grant to coordinate and develop the PTN, alongside a similar grant supporting the establishment of a southern PTN node comprising Monash University and other institutions. Combined, these institutions cover a significant

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majority of the biomedical research community of the state with the ambition of total representation of all PTs.

In developing the PTN, the Bio21 Cluster has surveyed the facility managers to identify their capabilities and expertise, understand facility operational and management structures, identify professional development interests of facility managers, and assist in marketing their services to the wider scientific community. As each platform is located within a member institution of the Bio21 Cluster, with that “home” institution having autonomy over the management of the PT, there are varying approaches to management, including cost recovery methods. The PT manager has an essential role in establishing and maintaining a professionally run PT, and many managers develop into their role from a scientific or technical background. A major challenge faced by all managers within the PTN is to meet the ongoing operational costs of the facility. PT managers are grappling with issues relating to cost recovery, including accounting methods, how to establish charges for academic versus commercial research, and how to value services such as provision of advice.<sup>3</sup> The survey described herein provides a snapshot of how platform facilities across the Bio21 Cluster approach establishing pricing models and how the direct operational costs are met, or not met, as the case may be.

There are a limited number of published studies detailing the cost recovery of platform facilities,<sup>4,5</sup> and other information is available online through scientific member associations.<sup>6</sup> These show, consistent with our data, that facilities do not recover 100% of direct costs. Although 100% cost recovery is a fiscally sound approach, Angeletti et al.<sup>1</sup> emphasized that this is not appropriate in many environments, as it is likely to be an impediment to the development of facilities and to an innovative research environment.

## MATERIALS AND METHODS

In August 2009, an online survey asked several questions (see Supplemental data) to identify how costs were established, structured, and recovered within PTN. There was a 43% response rate ( $n=19$ ). Questions were focused toward establishing who determines pricing, what costing approach is used, what percentages of direct costs are recovered, and what the principal funding sources are.

## RESULTS

Survey results show that many facilities have made substantial equipment investments (Fig. 1). It is recognized by senior scientific staff within these institutions (Bio21 Cluster, personal communication) and elsewhere<sup>1</sup> that the expertise of the managers and the staff supporting these facilities is a critical factor in their success. Across

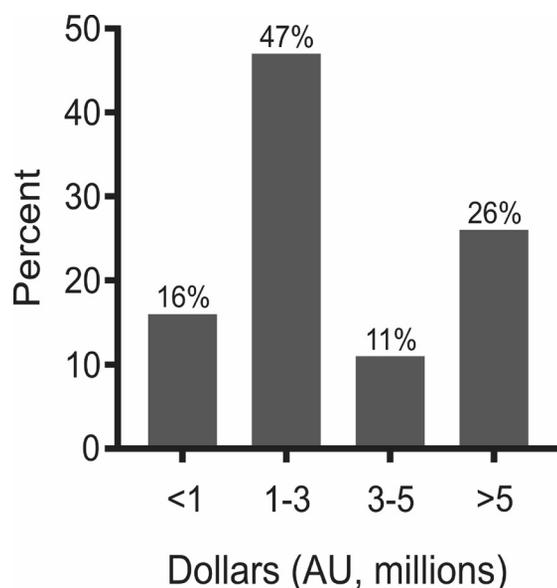


FIGURE 1

The percentage of platforms in which the estimated replacement value of platform equipment/technology is within the ranges shown. AU, Australian dollars.

the Bio21 Cluster, facilities have between 1 and 58 specialized staff.<sup>2</sup> A substantial investment is made by all stakeholders in the human resources and equipment in establishing platform facilities. Identifying a business model supporting their longer term viability is complex and dependent on the appropriate pricing levels and structures and must also take into consideration the source of the initial establishment funding, the stakeholders, and other users of the facility.

Across the Bio21 Cluster PTN, facilities are categorized into several broad criteria indicating the areas in which they provide services. Analysis of this network showed that service facilities are available throughout the cluster, which facilitates end-to-end research from basic discovery science to drug design and screening, biobanking, and clinical trial services (see Supplemental Fig. 1).

### Who Establishes the Pricing Structure for a PT Facility (PTF)?

Establishing an appropriate pricing structure is one of the greatest challenges for platform facility managers. Our survey results showed that in 79% of cases, platform managers have direct involvement in this process, and committees or other administrative staff have involvement in a lower percentage of cases (Fig. 2). The percentages in Figure 2A, which add to greater than 100%, indicated that in many cases, there was a combined involvement in establishing the pricing structure. In 32% of cases, the platform managers have sole responsibility (Fig. 2B). In 21% of cases, there is no involvement

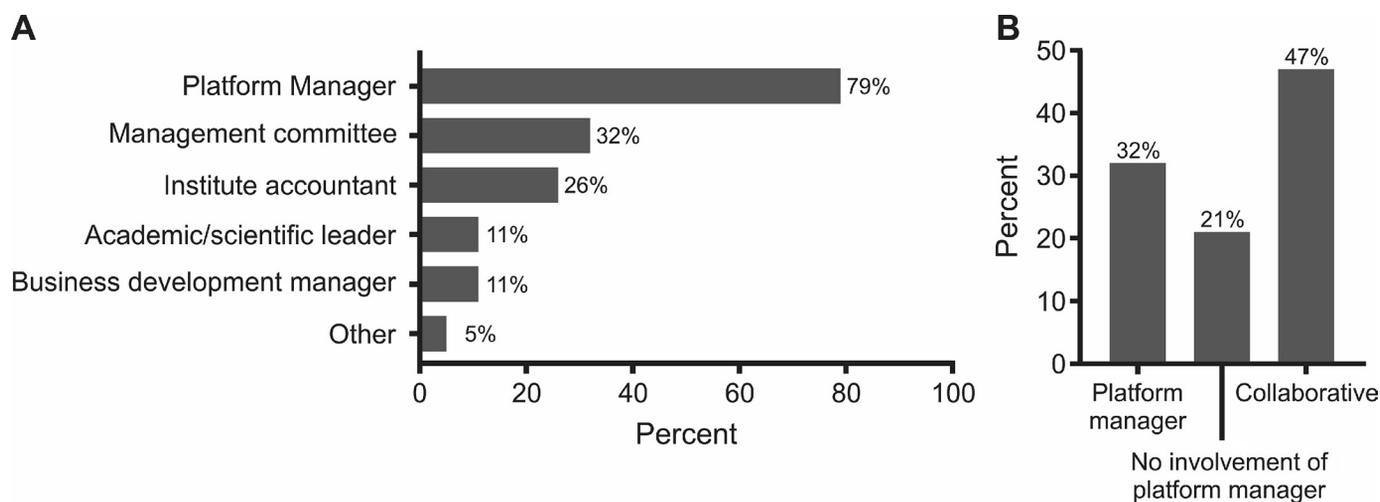


FIGURE 2

Pricing structure and charges are normally set in a collaborative process involving the platform manager. (A) Survey results show that the platform manager has a major contributing role in establishing pricing structure costs, and their involvement is in 79% of platform facilities. (B) In 32% of cases, the platform manager has sole input in establishing pricing structure and charges. In 21% of cases, there is no involvement of the platform manager. In the majority 47% of cases, establishing costs is done in a collaborative process.

of the platform manager, and the responsibility normally falls to a management committee or an accountant. In 47% of cases, establishing the pricing structure and charges is a collaborative process among the facility manager, management committee, and an institute accountant (Fig. 2). Involvement of the platform manager is reflective of his expertise in the provision of service in his specific area.

#### What Costing Approach was Used?

The predominant model (42% of cases) used for generating costs was activity-based costing (ABC; Fig. 3), which is a model that identifies activities in an organization and assigns the cost of each activity to all products and services.<sup>7</sup> The survey indicated that across from the Bio21 Cluster, “other” approaches were used in 21% of cases, indicating that the approach to costing varies substantially between platforms. Other approaches were often combinations of each of the single listed approaches (Fig. 3). These included: 1. a mixed model, dependent on which item is being charged, the internal demand, and the degree of competition; 2. a best estimate in consultation with a manager, an accountant, and the chief operating officer considering factors such as what the market will bear and what other institutions are charging; 3. a mixed model based on a government-regulated MBS and a best estimate of which was investigation-dependent; and 4. consideration of consumables only or time and consumables without provision for fixed costs. Absorption costing, which estimates the

full cost of service provision, including labor and all overheads, was used in 16% of cases. Pricing similar to a competitor was applied in 11% of cases (Fig. 3). In a lower proportion, costs were decided by an accountant or through using a best estimate approach.

Pricing structures are typically based around a tiered model, whereby rates are charged dependent on whether the client is an academic from the home institution (including all that provided establishment funds), an academic from another institution, industry-based, or from a government research laboratory (Fig. 4). Sixty-three percent of respondents indicated a three-tier model, and 26% and 11%, respectively, indicated a two-tier and one-tier model.

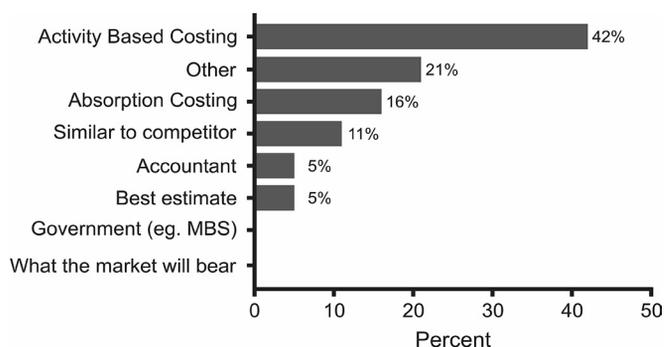
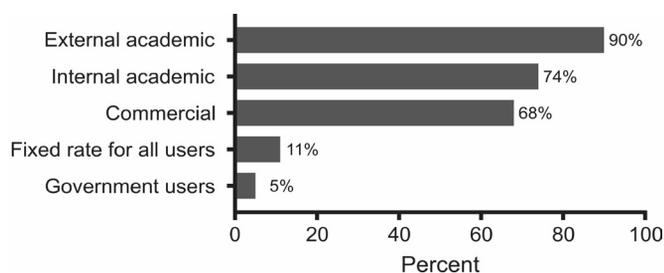


FIGURE 3

Survey responses showed that ABC was the predominant costing model in PTFs in the Bio21 Cluster. Other approaches included combinations of each of the above as described in the text. MBS, Medical benefits scheme.

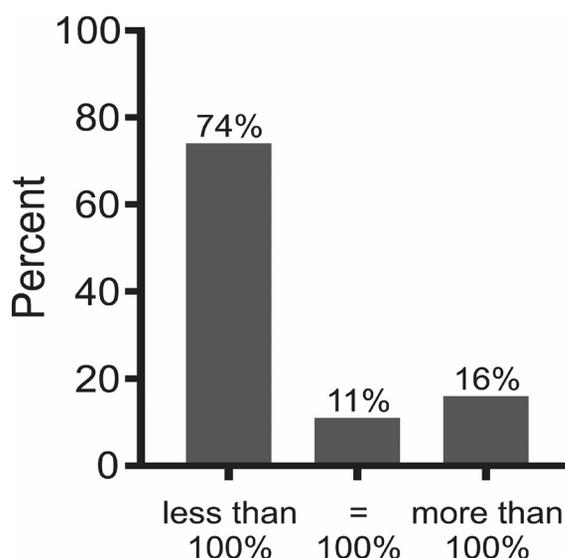


**FIGURE 4**

The percentage of Bio21 Cluster platform facilities that have pricing structures for different industry segments. The majority of platforms has different structures for external academic, internal academic, and commercial (industry)-based clients. A low proportion has a fixed rate and a distinct rate for government users.

### Direct Costs Recovery and Sources of Income Covering Direct Costs

In estimating cost recovery, institutional subsidies or top-ups were excluded. Direct costs included salaries, consumables, maintenance, and replacement of equipment/parts and other expenses directly attributable to running the platform. A clear majority (74%) of platform facilities recovered less than 100% of its direct costs (Fig. 5). When direct costs are not met, it typically falls to the home institution or collaborating/partner institutions to provide additional support, ensuring the institution has a vested interest in developing the facility. Twenty-seven percent of facilities recovered equal to or greater than 100% of direct costs (Fig. 5). This showed that a substantial proportion of facilities can operate as a viable business.



**FIGURE 5**

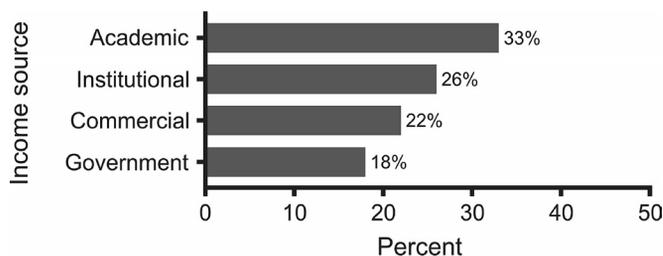
The percentage of platforms in the Bio21 Cluster having less than, equal to, or more than 100% of direct costs recovered.

Analysis of the source of funds supporting cost recovery showed that academic sources, which included those derived from research grants, represented the largest segment of income at 33% of the total, and institutional subsidy provided an additional 26% of direct costs (Fig. 6). Commercial clients contribute to 22% of direct costs of facilities, although they represent a much lower proportion of the total number of clients, demonstrating the significant benefit of attracting this sector to the PT (Fig. 6). Although the commercial sector is very important for facilities, the variable nature of their use of such facilities can create substantial management and staffing issues.

### DISCUSSION

Platform facilities in the Bio21 Cluster represent the entire spectrum of biomedical research from discovery to clinical outcomes. The variability in expertise and resources in each of these PT throughout this pipeline mirror the variability in approaches to facility operation, including management and cost recovery.

Platform facilities provide essential services to researchers and are an invaluable resource for the biomedical research community in Australia. However, there are some substantial sustainability issues related to the ongoing operation of these facilities. These include the periodic need to upgrade and enhance core infrastructure to maintain state-of-the-art facilities and to ensure staff with critical expertise are retained to operate the facilities. Recruitment, retention, and training of a specialist staff are an ongoing concern. Ensuring a pipeline of expert scientists and technicians in platform facilities is a key to their sustainability. To ensure facilities are used to their full technical capability, staff need to update skills through attendance at training courses, which from an Australian perspective, are often far away and require a substantial cost simply to get there. There are a limited number of schemes supporting the travel of technical staff.



**FIGURE 6**

Breakdown of the source of funding providing for direct costs.

To provide for the full value of the initial investment, often made largely with public funds, PT must be widely accessible. This most often means that they need to be affordable enough to encourage their use and to facilitate the experimentation, which is essential for innovation and high-quality research outputs. This is often at odds with fiscal responsibility. A challenge for the platform managers is establishing appropriate prices that will encourage the use of the facilities and provide some support to meet the direct costs of the facility. Often, 100% cost recovery is not a viable option, as it prices out many academic researchers who are the major users of such facilities. An additional challenge is that final funding granted from major funding bodies is typically less than that requested. For the Australian Research Council Discovery Projects in the Biological Sciences and Biotechnology sector, the 2006–2010 average of approved funding as a percentage of that requested was 66%.<sup>8</sup> The same statistic from the National Health and Medical Research Council (NHMRC) shows the 5-year average from 2005 to 2009 for project grants was 89% (NHMRC, personal communication). This may exacerbate the problem, as the academic scientist who planned to use such facilities must reconsider even upon successful grant applications. Accurate planning and obtaining accurate quotes for services from facility managers during budget preparation, rather than estimating (in the broadest sense) the cost of an experiment, have the dual advantage of giving better budget estimates, which are more likely to be fully funded, and it informs grant scheme managers and assessment panels of the actual cost of scientific research.<sup>9</sup>

Critical to the sustainability of a PTF is the ability to attract and retain clients. In many cases, an initial funding period supports a model, where subsidized costs are applied, which encourages academic researchers to use the facilities. This structure normally recognizes the initial monetary and in-kind contributions. Transition out of this period sees substantial challenges for the facility, as prices are often increased, resulting in an exodus of the academic researcher, ultimately, to the detriment of the facility. This jeopardizes initial investments and the staff who have developed expertise in an important area. The question then becomes through which mechanisms are the facilities and staff supported. Is 100% cost recovery essential, or is a value placed on other outcomes? It is evident from the survey that most facilities do not meet their direct costs and rely heavily on institutional support. Institutions balance the value of publications and other research outputs along with the prestige of hosting the PT with the cost of subsidizing the PT. The true value in establishing PTs in the

Bio21 Cluster and in maintaining them is reduced duplication of facilities, enhanced access to facilities, expert personnel to support researchers, and training of honors and graduate students in biomedical and bioengineering fields.

Developing the means for PT staff to meet their training requirements is important to ensure that facilities run as an effective business supporting scientific research. Similar to the travel grant schemes widely available for scientific research staff, we encourage the establishment of a greater number of publicly funded or philanthropically funded travel grants to support the technical training needs of staff who operate PTFs. In recognition that PT managers operate (in principal) in a small business environment, the Bio21 Cluster through the Victorian PTN will continue to provide professional development training to build those other essential skills. Expanding this training will be important considerations for the future.

Although our survey did not allow for the determination of the level of additional support required for PTFs, it was evident that it was needed. Increased prices must be balanced by the need to maintain access. Where facilities are established with public funds and continue to provide benefit to the research community, ongoing support should be provided for staff and maintenance, which represent the greatest ongoing costs. The challenge is to identify mechanisms through which this can occur. In the short to medium term, the already substantial investment in establishing these facilities by public/government funds provides a strong case for their continuation. A lack of ongoing operational support at too early a stage may result in the ultimate demise of important scientific resources and should be considered a failure of strategic planning for vital scientific resources on a local, state, and national level. In the longer term, if the scientific community can truly recognize the value in a service, these platforms are likely to recover greater than 100% of direct costs and will contribute to the building of the biotechnological base, providing greater opportunity for researchers and technical experts alike.

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