Practitioner Paper

What Collaborators Want: Planning, Monitoring and Evaluating Research Collaborations

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Abstract

This article describes an approach to planning, monitoring and evaluating research collaborations based on a structured approach to eliciting and measuring the value that each partner seeks to derive from the collaboration. During the phase of formulating the collaborative arrangements, the process can bring clarity to the initial expectations of each partner and so, possibly avoid prospective difficulties from the outset. During the course of the collaboration, it provides a means of assessing where improvements in the relationship might be needed. And at the end of the project, it provides a basis for assessing what has worked well, and what might need to be considered carefully in a future collaboration. The process also provides a basis for benchmarking collaborative ventures, based on ratings associated with the critical drivers of successful partnerships.

Part of the process is studied in the context of the formation of a collaboration relating to cyber security research.

Keywords

Partnership value, measuring collaborations, benchmarking collaborations

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Introduction

Collaboration between researchers from different institutions improves research impact, as measured through citation rates (Figg et al., 2006). Whitfield (2008) reviewed outcomes of collaborations, indicating that size, diversity and fresh input all affect success. Cheruvelil et al. (2014) concluded that high-performing collaboration research teams consist of diverse members who are committed to common outcomes.

Siegel, Waldman, Atwater and Link (2003) found that organizational and managerial behaviours and skills are critical factors in facilitating university–industry collaboration. Perhaps unsurprisingly, they found that the primary and secondary motivation of key stakeholders in a university–industry collaboration differed depending on the perspective of the stakeholder. Jeong, Choi and Kim (2014) used national research project information data to identify the determinants of international collaboration, but these results do not shed any light on the motivation of an individual collaborator placed on a particular collaboration.

Multiparty collaborations are complex by definition. There is a paucity of materials on what factors lead to a common objective, or how such an objective might be measured or monitored. In this article, the authors propose a method to measure the various perspectives held by members of a potential collaborative venture with a view to clarifying prospective partners' expectations of what they might need to contribute to the venture, and what they might gain from the outset. At this initial phase, the process may even reveal gaps in the capability and resources being offered, once the totality of the proposed partner contributions has been made explicit. The method was applied to a potential application for funding from the Australian Cooperative Research Centres Programme.

The Australian Cyber Security Research Institute (ACSRI) agreed to participate in a project to develop and test the partnership value methodology as an aid to forming a partnership. According to the ACSRI website[1]:

> The Australian Government recognizes Cyber Security is a top national security priority and is currently reviewing the existing Cyber Security Strategy introduced in 2009. The Australian Cyber Security Research Institute (ACSRI) seeks to support the Australian Government's focus on this growing problem by bringing together a collaborative network of researchers, universities, government and industry partners nationwide. Representing Australia's first coordinated strategic research and education effort between national cyber security agencies, industry and researchers, ACSRI will deliver an Australia wide approach to respond to cyber threats and cybercrime.

ACSRI is a not-for-profit company with a mission '[to] provide a safer and more secure digital environment for a stable and productive Australia'[1] At the time of writing, ACSRI had established an interim board and a research committee and was in the process of recruiting foundation partners. Cyber security is, of course, of great interest to a wide range of enterprises, including government agencies, universities and other research institutions, businesses and industries in many sectors of the economy such as banking, communications

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and so on, and other players such as AARNet (Australian Academic and Research Network). This project focused on three stakeholder groups:

1. Research providers: three universities, the Australian National University (ANU), Deakin University (DU) and Edith Cowan University (ECU).
2. Users of the research: three government agencies, the Australian Crime Commission (ACC), the Australian Federal Police (AFP) and Australian Government's Computer Emergency Response Team (CERT).
3. Two other enterprises, Cisco and AARNet, Cisco being a major industry supplier, and AARNet being a dedicated provider of information communications technology capabilities to enable Australian education and research institutions to collaborate with each other and with their international peer communities.[2]

Method

The approach taken to this project derives from a general system for performance measurement of an enterprise described in Fisher's (2013) work. The thesis underpinning the system is that for an enterprise to be successful, it needs to create and add value for five key groups of stakeholders: the owners of the enterprise, its customers, its people, its partners and the wider community. Fisher (2013, Chapter 7) focuses explicitly on partners, who are categorized as shown in Figure 1.

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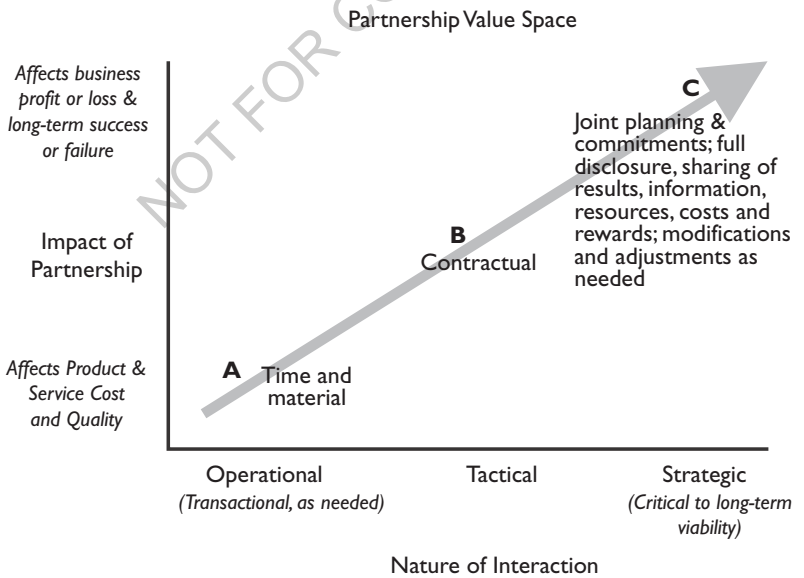

Figure 1. There is a continuum of relationships that describe a partnership. However, it is helpful to distinguish three types of partnership, each with a characteristic concept of Value. A, B and C correspond to quite different types of partnership.
Source: Fisher 2013, Exhibit 7.1.

Typical examples of the different types of partnership are:

1. Operational: The relationship is that of a supplier to an enterprise, such as an external contractor handling deliveries of products or providing IT support. If the service is unsatisfactory, there is generally no shortage of alternative providers.
2. Tactical: Which is typified by a number of entities collaborating on an infrastructure project. For the lifetime of the project, they work together. They may well be competitors on another project. It is a major problem, but not necessarily mission critical, if something goes amiss with one of the participants.
3. Strategic: Each participant brings something critical to the partnership, and loss of a partner may be disastrous for the collaboration.

A generic process for defining and managing stakeholder value is described by Fisher (2013), closely modelled on a proven process for managing customer value described by Kordupleski (2003). The starting point is to develop a 'value tree' for a given stakeholder: a tree-structured representation for value. For the different types of partnerships, A–C, the top levels of possible partnership value trees are shown in Figure 2.

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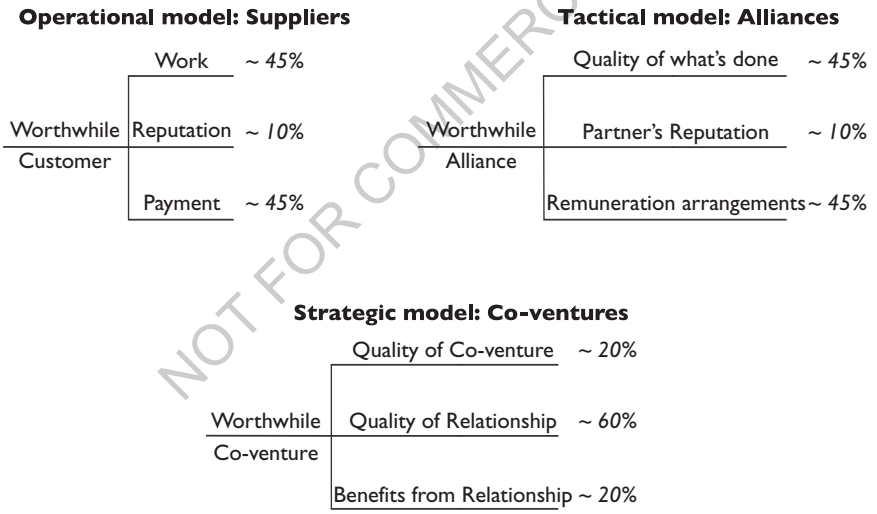

Figure 2. Value trees for three different types of partnership. In each case, the overall concept of Value is represented in terms of a few 'drivers'. The qualitative nature of the drivers and their (typical) relative reflect the varying nature of the relationship.
Source: Fisher 2013, Exhibit 7.2.

Each of the main branches can then be elaborated appropriately. For example, Figures 3(a) and 3(b) show possible elaborations of the tactical and strategic models and reveal some important differences; most notably, the emergence of the quality of the relationship as the most important driver of the overall perceived value.

The process for defining and managing partner value then requires a number of steps.[3]

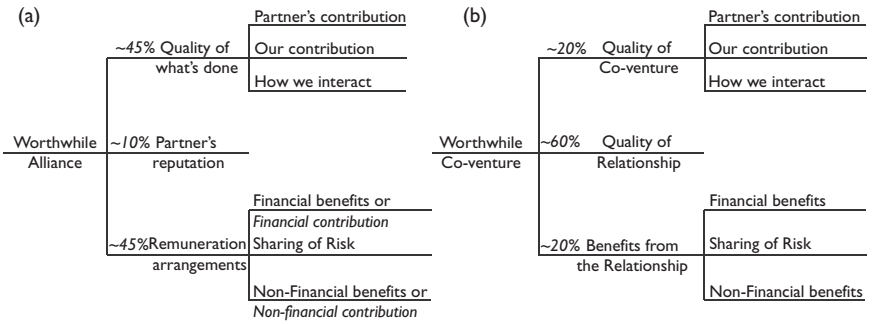

Figure 3. Elaboration of Tactical and Strategic models for Value Trees. The emphasis shifts significantly to the Quality of the relationship, in terms of determining the overall perception of Value.
Source: Fisher 2013, Exhibits 7.5 & 7.6.

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As will become evident in the case study considered below, the full meaning of value will vary considerably from participant to participant in a partnership. Each partner has to contribute a combination of materials, resources, capabilities and reputational attributes reflecting their particular circumstances that have qualified them to be a partner and to invest the effort required to make the actual process of collaborating work well. In return, they are seeking differing sorts of tangible and intangible recompense — monetary, capability and reputational — again depending on the nature of their business.

Phase 1. Preliminary Assessment of the Partnerships

Step 1: Choose a general model for partner value. For example, depending on the long-term view of the partnership, either Figure 3(a) or Figure 3(b), or something somewhere between the two may be appropriate.

Step 2: Customize the models to reflect the differing interrelationships. Each of the branches will have a small number of main attributes that collectively capture the ideal relationship with other partners as perceived by a given particular partner. If there are only a few partners, say two, three or four, then this will provide two, three or four value trees. However, when several partners are involved, it is desirable to add a set of complementary perceptions: How the partnership as a whole perceives value provided by each individual partner.

Step 3: Reach some measure of agreement on what is really important. If there is significant disagreement about (say) the relative importance of the three main branches in Figure 3(b) (assuming that is the agreed model), the whole future of the co-venture would appear to have a very shaky foundation.

Phase 2. Monitoring Progress of the Partnership

Step 4. Collect data from each partner.

1. Each partner is asked to record any significant adjustments to the information supplied in Step 3.
2. Then they are asked to provide ratings (on a 10-point scale, where 1 = *poor* and 10 = *excellent*) for each attribute and branch of their value tree.
3. After rating each branch, they are asked for the main reason for assigning these ratings.

Step 5: Use the results to improve the partnership. These data are collated by a facilitator, and discussed in a facilitated workshop, to identify where to focus efforts to improve how the partners work together.

Phase 3. End-of-term Assessment

Should the partnership be of fixed duration, the steps in Phase 2, suitably adapted, can provide valuable information about what worked well, and what might have been done better. Further, should some form of a continuing collaboration be contemplated, this is an appropriate point to consider what changes might actually be desirable in the fundamental model (Step 1). A case study that addressed just this phase for the Antarctic Climate and Ecosystems CRC (Cooperative Research Centre) is described in Fisher's (2013, pp. 84–91) work.

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Data Acquisition

Step 1: In consultation with the ACSRI CEO, Gary Blair, a hybrid form of Figure 3(a) and Figure 3(b) was selected, as shown in Figure 4.

Steps 2 and 3: Each partner was then asked to provide a set of attributes that collectively described their perceptions of the value they were seeking from the partnership. In relation to eliciting the attributes of 'quality of relationship', they were also asked whether they had any comments about the process of forming the partnership.

Separately, members of the ACSRI board were asked to provide the corresponding information for ACSRI's relationship with each type of partners.

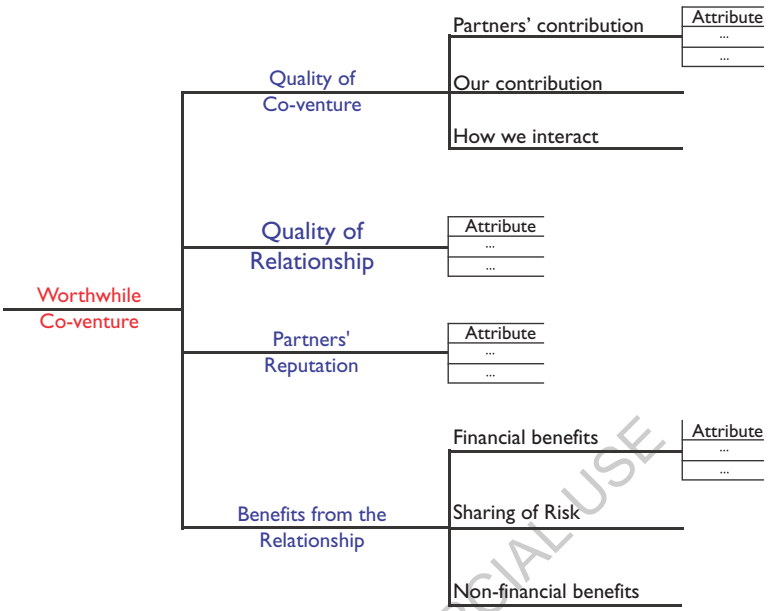

Figure 4. Value Trees Used in ACSRI Study: A Hybrid Version of Figure 3(a) and Figure 3(b)
Source: Author's own.

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It is important to recognize that a partner's concept of an ideal partnership arrangement does not spring completely from the minds of a few individuals; rather, it evolves as the process of forming the partnership proceeds from discussions within and between prospective partners. Thus a value tree cannot be separated from its mode of creation so that in the course of eliciting the attributes, issues relating to the process also come to light that can inform the progress of negotiations.

Analysis

Step 3 (continued). For each stakeholder group (except AARNet), the raw data associated with each main branch were synthesized into a set of attributes. For some attributes, a level of detail was preserved that clarified the intent of an attribute. This process resulted in two principal outputs:

1. A partnership value tree for that stakeholder group, representing the drivers and attributes that collectively defined the most important factors affecting the group's perception of value (worthwhile co-venture); and
2. The basis for creating a partnership value survey instrument in anticipation of Phase 2.

The tree attributes were then checked with each member of the group. After the sets of attributes were finalized, each group member was asked to provide the relative importance of the various branches in the value tree.

Corresponding analysis was carried out for the board's data, yielding complementary information. Pairs of provisional partnership value trees were then available, corresponding to each partner group. Additionally, process-oriented comments were summarized and confirmed with respondents.

The partnership value trees are only provisional because more work needs to be done. Consider, for example, the comparison of financial and non-financial benefits for ACSRI and government agencies. The corresponding sets of attributes are shown in Table 1.

Table 1. Comparison of sets of Attributes for perceived Financial and Non-financial benefits for ACSRI and Government agencies. Attributes printed in italics are regarded as comparable. Others are classified according to the scheme **I** (**ignore** the fact that it doesn't appear in the corresponding tree), **A** (**accommodate** either within an existing plan in a new initiative), and **D** (**discuss** with ACSRI Board and Partners).

	ACSRI's view	Government agencies' view
Financial benefits	*Revenue from commercialisation, royalty streams, …*	*Revenue to Australia from marketing innovations*
	Savings from fostering cyber security innovation nationally	*Savings from fostering cyber security innovation nationally*
	Patents – **A**	Underwriting Australia's future – **A**
	Increased tax revenue – **A**	Clarifying ROI for money spent on Cyber Security – **A**
Non-financial benefits	*Successful collaboration between researchers, government and industry*	*Successful collaboration between researchers, government and industry*
	Input to policy	*Evidence-based input to cyber security policy development*
	Introduction to international forums/partners - **D**	Enriched and non-fragile supply chain of skilled people – **A**
	Force multiplication in output from some of the new technology - **I**	'Honest broker' / disinterested commentator – **D**
	Placement of graduates – **D**	Reduced impact of cyber-crime in Australia – **A**
	Active engagement in track 1.5 and 2 dialogue – **D**	Clarifying how joint activities provide enhanced protection – **D**
	Viable domestic and export markets – **A**	

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The first two pairs of attributes for both financial benefits and for non-financial benefits have been italicized, indicating that they are regarded as matched. However, there remain several attributes that occur in one tree but not in the other, and these need to be considered further. The coding scheme I (ignore the fact that

it doesn't appear in the corresponding tree), A (accommodate either within an existing plan or in a new initiative) and D (discuss) has been used to classify them according to the action required, after which the trees are finalized.

Findings

The analysis crystallized and provided data for a valuable discussion on a number of issues that may have been assumed or implied in discussions to date:

1. There are core areas of commonality. For example, governance, operational leadership, effective communication systems and processes, collegial culture and commitment to ACSRI mission are essentially generic attributes of 'quality of relationship'.
2. There are core areas of commonality between ACSRI and the individual partner groups. Of necessity, the ACSRI trees vary from group to group, reflecting the differing positions of each group in the supply chain. However, there was significant agreement for most branches when comparing the customized ACSRI tree with that for a given group.
3. Following on from (1), commitment to mutual benefit appeared as an attribute of 'quality of relationship' in the ACSRI tree, but not in the universities' tree. This points to the need to clarify, ab initio, how 'glory is to be shared' when research has successful outcomes, something that has been an issue in some CRCs.
4. The unmatched attributes for financial benefits in Table 1 show that there is plenty of opportunity to explore hard benefits to be gained by government agencies.
5. Correspondingly, the existence of a diversity of views for the non-financial benefits may well reflect a historically low level of research activity in cyber security in Australia, and hence, a limited base from which to project potential non-financial benefits. Encouragingly, however, the diversity indicates the range and quality of non-financial benefits that could be realized through a collaborative research programme as envisaged by ACSRI and its partners, and ACSRI intends to consolidate these views within a formal benefits realization model for ACSRI-sponsored research projects.
6. Earlier, it was described how the partnership value trees can be used for the three 'macro' phases of a collaboration: project set-up, carrying out the project and project wind-up. However, there is more to say about its use during partnership formation. Not atypically, a few key participants are involved in initial discussions and start to shape the partnership. With ACSRI, the three members in each of the two groups are in broad agreement about what they are seeking (whilst recognizing that emphases will vary from partner to partner within a group). Thus, the partnership value tree developed for universities provides the board with a good idea of the perspective of a prospective university partner, thereby enabling the board

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to conduct negotiations in a better-informed fashion. The corollary is that, if a new type of partner is being approached—for example, from a sector so far unrepresented in the discussions—it is helpful to build the best guess at their partner value tree in advance.

7. There were no significant disparities noted between sets of impact weights provided (hence no surprises), so they are not discussed here.

Discussion

The process helps managers to identify the various drivers of value operating in a partnership. This knowledge might be utilized at the beginning, during or at the end of a partnership.

By identifying those drivers, managers are in a much better position to provide each partner with the value they seek from the relationship: co-creation of value, albeit with the full meaning of worthwhile partnership varying from partner to partner. Partners often have different views of the importance of different drivers of value and, in the absence of other knowledge, managers will assume or infer their own interpretation of value for each partner. For one of the cases studied, very significant management intervention was made in an attempt to improve the overall value of the partnership in a proactive way. The improved management understanding may prove uncomfortable for management as they seek to make appropriate adjustments, but in the development phase of a major collaboration, millions of dollars of investments are at stake. In an extreme case, a potential collaboration might be abandoned if the drivers of value are found to be so different between partners that proceeding would not be worthwhile.

Using the technique as a monitoring method during a partnership allows for appropriate managerial interventions to be made. Partners may shift their view of a collaborative arrangement as it proceeds, for example. Understanding that a partner initially joined a collaborative venture for reputational purposes but whose interest is now driven by financial considerations is important knowledge for a manager.

As an evaluation technique at the end of a partnership, valuable lessons can be learnt for future ventures. Managers deeply involved in a partnership may have difficulty seeing the various reasons a partner considers a partnership to have been worthwhile or not. They may perceive the major driver as the quality of work provided, whereas a particular partner derives more value from the reputational benefit. This knowledge has major implications in future recruitment of partners to a collaboration, and may significantly change the approach a manager may take.

The final point to make is that value is of no particular interest in its own right, but only insofar as it can be calibrated by connecting it to high-level business drivers via a value–loyalty curve (a slippery slope, in Kordupleski's language, when he introduced the concept). This point is relevant regardless of the stakeholder involved—customer, people, partners, community or owner. In this present study, it is provided by the link to something like "Willingness to

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recommend as a partner" or "Willingness to work together again on another project". Ratings on this variable provide the basis for setting improvement targets for value. (Competitive or benchmark scores may or not be available from other experience, so value must be calibrated in this way).

Acknowledgements

The authors thank Gary Blair and his colleagues on the board of ACSRI, for supporting this research project and facilitating discussions with prospective partners.

Notes

1. Retrieved from https://www.acsri.org.au/index.php
2. Retrieved from https://www.aarnet.edu.au/about-us
3. The subtitle to Ray Kordupleski's 2003 book is *The Art and Science of Creating Competitive Management*. The 'art' enters through the skill of a facilitator in working with the partners to identify and resolve potentially major differences in viewpoint about what is important in the partnership, and how it is faring, both prior to commencement and as the collaboration proceeds.

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