

21 A Scorecard for Designing and Evaluating University Partnerships

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Introduction

Since the introduction of the Balanced Scorecard framework in the 1980s, formal performance measurement and management strategies have become widely adopted in private, government, and non-profit settings. Although an abundance of conceptual frameworks have been developed, there are few which are designed to evaluate the unique collaborative efforts undertaken by universities. In this paper, we propose a scorecard tool for use by universities in managing and evaluating their collaborative partnerships with external organizations.

The scorecard design is the result of a literature review on existing research on why and how universities partner with other organizations, as well as what makes these partnerships successful. The core of the tool is based on several papers which themselves were systemic reviews of various subsections of the literature (Al-Ashaab et al., 2011; Amabile et al., 2001; Ankrah & AL-Tabbaa, 2015; Philbin, 2008a; Rybnicek & Königgruber, 2019). Each of the papers which constitute the backbone of the scorecard tool reviewed dozens, sometimes hundreds, of other articles. The tool also incorporates the findings of other articles which were discovered during our literature review but were not included in the main review articles.

As noted above, a literature-based, broadly applicable partnership scorecard framework is useful for two reasons. The first is that such a tool allows for direct comparison of partnerships which might otherwise be difficult to compare. An effective scorecard will be able to assess all partnerships, regardless of what organization the university is partnering with, the formality or scale of the partnership, the time frame the partnership operates under, or the stage of operation the partnership is currently in. The second benefit of a

scorecard is its ability to provide guidance to those building or operating partnerships. If a partnership scores low on a particular metric, they should be encouraged to improve in that area, so that if they are reassessed, they will score above an acceptable threshold. The scorecard can be used to identify both areas of improvement for individual partnerships and areas of success, which can then lead to the identification of best practices.

The proposed scorecard contains a diverse set of performance measures designed to evaluate the effectiveness of collaborations. The tool contains 144 indicator variables classified within three categories (institutional factors, team factors, and goals and outcomes) and across three phases of the partnership (initiation phase, operation phase, and delivery phase), as well as 12 quantitative metrics. The scorecard's modular design makes it applicable to a wide range of university partnership models. The scorecard is designed to help universities in two ways: (1) by providing guidance to individuals engaged in partnerships on how to structure and operate the partnership, based on literature-backed best practices, and (2) by giving university administrators a tool to assess the effectiveness of partnerships and compare diverse partnerships along standardized metrics. This tool will allow universities to improve the effectiveness of their existing partnerships and also make better-informed decisions regarding their larger partnership strategy.

Similar projects have been attempted before. The existing work generally falls into three categories: articles that review specific cases of collaboration between universities and industry; articles that review these cases and extract best practices; and a handful which attempt to operationalize these best practices in a tool to measure or improve the effectiveness of university–industry partnerships. Two commonalities among the literature are important to note, as our project differentiates itself from those which came before it in these ways. First, most of the literature takes as its audience the private sector, and therefore, the criteria of what makes a successful partnership are based on what is best for a firm partnering with a university, rather than for the university itself. A notable exception to this is Ankrah & AL-Tabbaa (2015), in which the authors view partnerships from the perspective of both universities and companies.

Our work takes universities as its audience, and specifically those people within universities who are administering partnerships. Therefore, our scorecard is designed to record metrics that are of interest to universities that are engaged in partnerships.

Second, the literature is almost entirely focused on partnerships that revolve around research and development. However, this is

just a subset of the kinds of partnerships that a university might engage in. For example, our home institution (Arizona State University, ASU) partnered with Starbucks, a publicly-owned firm, to provide education services to Starbucks' employees (Arizona State University, n.d.), and with the Ministry of Education in China to offer ASU degrees out of Hainan University in Hainan, China (*Hainan University—Arizona State University Joint International Tourism College*, 2018). Both of these partnerships are significantly different in both form and function from an R&D-based partnership, and therefore need to be assessed differently. Our tool is designed to be useful for all university partnerships, regardless of whether they are focused on R&D, delivering education, or something else entirely.

Defining University Partnerships, Collaborations, and Teams

Partnerships between universities and other organizations—private companies, NGOs, public entities, or other universities—have proliferated in recent decades (Hagedoorn et al., 2000; Poyago-Theotoky, 2002; Rybnicek & Königsgruber, 2019). Government funding for higher education has long been unsteady, but took a sharp downward turn during the Great Recession of 2008—and those revenue streams have not returned (American Academy of Arts and Sciences, 2016). Many universities across the country have pursued alternative revenue streams by increasing tuition and fees and by exploring partnerships with private, nonprofit, and other public organizations. According to Perkmann and Walsh (2007), this development is a result of three key shifts in what they call the “academic capitalistic landscape”:

- Federal policies/legislation aimed at increasing research that would result in more patenting and licensing
- Decreases in federal funding; increased need for private investment
- Increased importance of the technology industry as a catalyst for innovation and economic growth

Since the 1980s, universities have had to navigate reductions in public investment in higher education, coupled with an uptake of federal policies aimed at improving industry competitiveness. Reduced government funding has pressed universities to explore partnerships as an effective means to source new revenues for research activities; accompanying this shift has been a significant rise in industry investment in university research (Poyago-Theotoky,

2002). Collaboration in research has broadened and diversified stakeholder involvement in the knowledge creation process (Bozeman et al., 2013). The shift has generally been applauded because it allows universities to continue driving the innovation process while distributing costs and increasing industry talent in research activities. Private and public organizations and universities have come together to capitalize on knowledge-based innovation that would not be possible by the actions of each institution alone.

There are many reasons why a university might enter into a partnership, including pooling resources, influencing information flow, and improving competitive advantage (Hagedoorn et al., 2000). Motivations for collaborating and forms of engagement differ in each partnership arrangement. University partnerships may take many forms and can be formal or informal. Some examples include a single academic researcher working with another researcher at another university, a firm contracting with a university to conduct R&D on its behalf, universities licensing their technology to companies for commercialization, and universities entering into strategic partnerships with other universities (Ankrah & AL-Tabbaa, 2015; Bozeman et al., 2013; Hagedoorn et al., 2000; Poyago-Theotoky, 2002).

For this project, we draw inspiration from a Council on Competitiveness (1996) report on R&D partnerships to define a *university partnership* as any cooperative arrangement engaging a university with another university, a company, and/or a government agency in various combinations to pool resources in pursuit of a shared objective. A significant departure from the original is that our definition includes partnerships with objectives other than R&D. We also differentiate a partnership from a collaboration, in that we follow Bozeman et al. (2013) in defining a collaboration as “social processes whereby human beings pool their human capital to achieve shared objectives” (p. 3). A partnership is an official relationship under which one or more collaborations may occur. A partnership implies collaboration between members of the partner organizations, but the degree to which these members collaborate may vary significantly from partnership to partnership. Also, the form of the collaboration may differ significantly; a partnership between a university and a company might result in scientists collaborating on a specific area of research, while a partnership between two universities might result in collaborations between administrators working on recruiting into each other’s programs or publicizing a shared research project. We define the group of people engaged in collaboration as the partnership team. The team may change in size as the partnership progresses, though it can be assumed that key members remain engaged throughout the lifespan of the partnership.

Partnership Scorecard Background and Literature Review

Performance Management

The transformation in the private sector from family-owned single businesses to multifunction enterprises in the late 19th century required companies to expand and subdivide their activities into specialized departments. The specialization and diversification of units introduced administrative challenges that demanded the creation of the business manager role to coordinate efforts and outcomes from the multidivisional structure (Chandler, 1990). In business administration, performance management allows an organization to assess its progress toward its objectives, highlight its strengths and weaknesses, and support decision-making for future initiatives. Project management can expand the executive officer's analysis beyond cost-control measures toward long-term strategic directives and sustained economic value creation for stakeholders and employees at all levels (Cokins, 2009).

Performance management uses different methods and tools to integrate operational, technological, social, and financial data. The Balanced Scorecard (BSC) is one popular performance management tool. Developed by Drs. Robert S. Kaplan and David Norton in the '90s, the BSC was based on a study of performance management in companies whose products were dependent on intangible assets. According to Kaplan and Norton, in order to derive the maximum value from the company's work, the intangible assets should be measured alongside tangible ones (Niven, 2014). As a result, the BSC analyzes organizational performance and improves the alignment between the corporation's mission and the operational activities, showing the value of the unique aspects of the organization to support its final goal (Kaplan, 2009). This strategic approach also provides feedback on internal business processes and external outcomes, continuously contributing to organizational awareness (Lin, 2015).

However, the BSC is designed for use with private firms. It is of limited use when assessing partnerships, which—unless they are formalized in independent organizations, such as joint ventures—are difficult to fit into the BSC framework. The BSC is also of limited use when analyzing partnerships from the perspective of a university, which has significantly different priorities and obligations than a private firm. Private firms are interested largely in producing market value, whereas universities must also consider their ability to deliver public value (see Bozeman, 2002). In fact, Anderson and Taggart (2016) have noted that “the normative environment of higher education sometimes stands in sharp contrast

with the logic of corporatism and/or the profit goal orientation” (p. 780). The unique needs and obligations of a university require a purpose-built assessment tool.

It is worth noting the work of Al-Ashaab et al. (2011) and their attempt to adapt the BSC to assess university–industry partnerships. Their framework was designed to measure success using metrics relevant to industry, and “identify the opportunity areas when managing open innovation research activities in collaboration with universities and other research institutes” (Al-Ashaab et al., 2011, p. 569). Their approach is useful in that it helps identify each partner’s main characteristics, how they deal with innovation, and how aligned their goals are, which is important for the planning phase of a partnership. The information gathered from this exercise can aid industry leadership in deciding whether to engage in a partnership, communicating the importance of the collaboration to company staff, establishing the rules and goals for the partnership, and determining how the project fits into the larger strategy of their organization. The Al-Ashaab et al. scorecard can be used in all stages of the partnership as a monitoring and evaluation tool throughout the life of the collaboration.

Al-Ashaab et al.’s tool is useful and effective in its own right—however, it assesses from primarily an institutional (rather than an interpersonal) perspective, with its core objectives focused on measuring how innovative a specific organization is. Considering how many partnerships are based on personal relationships, this is a large flaw. The tool also does not capture the collaborative behavior of both partners, focusing instead on the firm. The authors also retain the BSC framework and, thus, create a tool that is of more use to firms assessing partnerships with universities than to universities assessing partnerships with other organizations. A new tool is needed. Our project takes inspiration from the BSC as a model for performance management, but we have attempted to build a university partnership scorecard in the style of the BSC, rather than based on the BSC.

Motivations For and Structure of Collaborations

Partner motivations are unique to the participating organizations and highly influential on the nature of the relationship. Evidence from the literature highlights a range of potential benefits of research collaboration for both research partners (academia and industry) as well as society. According to Ankrah and AL-Tabbaa (2015), there are three primary types of benefits that motivate the universities and industry to collaborate: economic benefits, institutional benefits, and social benefits.

Economic Benefits

Universities are motivated to share research costs, capitalize on business opportunities that generate revenue, and contribute to the local economy. Collaboration allows industry to improve product quality, build market competencies, and benefit from universities' access to public research funding (Ankrah & AL-Tabbaa, 2015; Lee, 2000). Partnership outcomes also have an impact on community and economic development. For instance, the increase in the research collaboration of Korean physicists with American universities since the 1990s enriched the knowledge base in Korea. In fact, the great majority of the first-generation Korean physicists completed their doctorate degrees in the United States (US), which helped Korean industries to innovate, develop at unexpected speed, and experience benefits from the technological advancement in the US. In turn, this industry development had positive impacts on the economy of the Korean Republic (Kim, 2006). Moreover, collaborations can help companies maintain competitive positions and profit margins in the national market as well as increase international market share and profitability (Hanel & St-Pierre, 2006).

Institutional Benefits

Universities benefit from collaborations which connect students and faculty to practical industry problems, provide a testbed for ideas, maintain channels for the practical application of university research as well as training and employment pipelines for students, and continue the university's outreach prerogatives (Ankrah & AL-Tabbaa, 2015; Lee, 2000). For industry partners, collaboration can provide access to new knowledge and leading-edge technologies, offer opportunities to hire talented graduates, and accelerate the commercialization of technologies (Ankrah & AL-Tabbaa, 2015). Furthermore, firms are increasingly engaging in collaboration as a means to explore solutions for product design, product development, quality improvement, product patents, and other R&D agenda items. Additionally, universities and industries stand to strengthen their reputation and build on each other's brands by engaging in collaboration (Ankrah & AL-Tabbaa, 2015). Advantages like these motivate industries not only to engage more with education institutions, but also to develop sustainable long-lasting relationships with universities (Lee, 2000).

Social Benefits

Knowledge production and technology innovations are the main two social benefits (common pool goods) of research collaboration (Bozeman et al., 2013). In the highly competitive innovation space

countries are eager to assert the originality of citizens' contributions to knowledge platforms. In some cases, collaboration was found to boost the novelty of these outcomes. Hanel and St-Pierre's (2006) findings suggest that outcomes from collaborative relationships have a higher degree of originality as opposed to non-collaborative innovation outcomes. For instance, nearly 22 percent of collaborating firms introduced what's considered "world first" innovation while only 10 percent of non-collaborative companies did the same. Additionally, half of the collaborative firms introduced "Canada-first" innovations compared to just 25 percent of non-collaborative companies. The distribution of benefits varies based on the contributions from each partner and how outcome ownership is negotiated. However, there is a consensus that the practice of collaboration is overall beneficial for industries and universities and will continue to be used as an effective means to drive innovation and deliver services (Lee, 2000). "The flow of developmental, educational ideas, of the need to cultivate intellectual capital and innovation, runs between the university and industry in both directions" (Slotte & Tynjälä, 2003, p. 446).

Collaboration Process

The majority of the literature in this area is focused on the concept of university–industry collaboration (often shortened to UIC), which refers to "the interaction between any parts of the higher education system and industry, aiming mainly to encourage knowledge and technology exchange" (Ankrah & AL-Tabbaa, 2015, p. 387). This reflects the bias in the literature for studying only the partnerships universities make with private firms. Although this is only one type of potential university partnership, many of the insights gleaned from studying UICs are applicable to other types of university partnerships as well. Even within the limited scope of UICs, partnerships vary in terms of structures and collaborations differ in their formality, duration, scope, management, partner proximity, and desired outcomes.

Despite the popularity of collaborative ventures, not all outcomes and services need to be achieved through collaboration (Hilvert & Swindell, 2013). If collaboration is determined to be an optimal strategy, then partners must work closely to develop a formal relationship. The literature suggests that following a framework for partnership execution creates a solid foundation for a healthy and successful partnership (Philbin, 2008a).

The success or failure of collaborations is related to the form of collaboration (Amabile et al., 2001) and collaboration motivations (Ankrah & AL-Tabbaa, 2015). Decisions in the formation phase

may lead to several different partnership forms; some may benefit from rigid collaboration structures while others have flexible collaboration structures. An important initial consideration is establishing trust between partners and setting a clear direction for the partnership. One study (Philbin, 2008b) proposed a five-step framework to use for the design and management of partnerships. In this study, researchers interviewed key stakeholders (academic staff, professional services staff, and business contacts in external technology companies) and identified familiarity, trust, common understanding, access to social networks, social interactions, and commitment as the major factors that have a bearing on the formation and management of partnerships. Based on these findings, Philbin (2008b, p. 496) proposed a 5-step linear process for the formation and management of partnerships:

1. Terrain Mapping—evaluate opportunity landscape for collaboration
2. Proposition—review partner values and assets, align research offerings of the research organization with the strategies/objectives of the external company
3. Initiation—the initial formation of collaboration
4. Delivery—operational management stage
5. Evaluation—a review of the post-delivery outcomes

Numerous studies make a similar case for differentiating levels of collaboration progression and assigning various objectives and tasks at each stage. Kraut et al. (1987) outlined a simpler process format which includes three stages: the initiation stage (planning), the execution stage (implementation), and the public presentation stage (reporting). We use this model to structure our scorecard and to illustrate how collaborators can shape and manage successful partnerships.

Planning

In the initiation and planning stage, the partners must articulate well-defined goals and objectives and establish ground rules early in the process, so stakeholders are clear on all expectations and guiding principles that will govern the partnership (Rybnicek & Königsgruber, 2019). The leadership of all partner institutions should communicate the importance of the collaboration to the organizational staff in general, so they are mentally ready to provide the required support to the collaboration-related activities when needed (Amabile et al., 2001). In addition to researchers, the team should include people with business experience (Siegel et al., 2003)

for expert insight on the marketability of the intended project/service from the initial stages. The project manager for the collaboration project should have in-depth knowledge of the technology needs in the field, be inclined to networking across functional and organizational boundaries, and make connections between the research and the final product application (Pertuzé et al., 2010).

UICs work best when the collaboration supports the mission of each collaborator (University–Industry Demonstration Partnership, n.d.). Organizations looking to collaborate with a university should have a clear understanding of the project's outcomes in reference to its own strategic context. This can be done by determining what the collaboration opportunities are, defining the partnership's output, and identifying the user of the partnership's output (Pertuzé et al., 2010). Evidence suggests that universities should select for the collaboration team researchers who understand and appreciate the practices, technology goals, and project strategy of the partnering organization. The partnering organization should also share information with the university researchers, so the collaborators may help the organization to achieve its vision (Pertuzé et al., 2010). Moreover, partners need to understand each other's capabilities, commitments, roles, responsibilities, expectations, resources, and interests from the initial stages of the collaboration (Amabile et al., 2001). A lack of clear understanding in the beginning can result in mission confusion, create mistrust among the partners, and sometimes seriously delay the work.

Implementation

During the implementation stage, the regular, clear, documented, and effective communications among the partners are the most critical determinant of success (Bozeman et al., 2016; Philbin, 2008a). Partnership agreements that emphasize networking between individuals and collaboration among research groups are vital for rapid knowledge dissemination (Abramo et al., 2009). Increasing the frequency of communication allows individuals and organizations to advance relationships, develop trust, and build strong networks. In addition to regular team meetings, collaborations benefit when the partner organizations build broad awareness of the project within the organizations. Success is also related to partners' ability to communicate feedback on project design between the organizations. The team's feedback on product design increases the marketability of the final product (Pertuzé et al., 2010).

The effective use of research members' capabilities and the establishment of conflict resolution mechanisms are also essential tools for a successful collaboration (Amabile et al., 2001). The

team and partner organizations should embrace changes in technology that happen during the collaboration process, as no single technology is likely to fit the needs of all team members at all times (Kraut et al., 1987). Parties should be open to considering any changes in the collaboration process and strategy, as long as changes provide added efficiencies or capabilities, not already provided with existing practices.

Reporting

In the third and final stage of public presentation (reporting) of collaboration, Kraut et al. (1987) express the need for credit allocation and urges organizations to give team members the opportunity to be recognized for their contributions to the work. This can be done by implementing a reward system that recognizes team efforts, risk-taking, personal relationships, and building networks as part of the collaboration process (Siegel et al., 2003). Ideally, neither organization should end the partnership when the collaboration ends, but the partner organizations should instead invest in a long-term relationship with a multi-year time frame. The main reason for this is that personal relationships take years to develop, and the creation and maintenance of personal relationships is what holds collaborative research efforts together (Kraut et al., 1987).

Partnership Forms

The forms of university partnerships have been discussed from different points of view in the literature, and emphasize the level and types of engagement in the collaboration from beginning to end. One of the more widely-discussed frameworks groups university collaborations with industry into four forms: joint ventures, networks, consortia, and alliances (Barringer & Harrison, 2000). Other classification approaches include Santoro and Gopalakrishnan's (2000) topology, which suggests four forms of UIC: research support, cooperative research, knowledge transfer, and technology transfer. Bonaccorsi and Piccaluga's (1994) framework considers six forms of UIC: personal informal relationships, personal formal relationships, third parties, formal targeted agreements, formal non-targeted agreements, and the creation of focused structures. Of the classifications, Bonaccorsi and Piccaluga's (1994) has the broadest scope and is used by Ankrah and AL-Tabbaa (2015) as a framework to analyze different forms of UIC in their literature review. According to Ankrah and AL-Tabbaa (2015), the six forms show an increasing level of organizational involvement, which can be understood from three dimensions: university

resource involvement, agreement length, and collaboration formalization. Our discussion of collaboration form focuses on Bonaccorsi and Piccaluga's (1994) framework.

Of the six forms proposed by Bonaccorsi and Piccaluga (1994), "formal targeted agreements" are perhaps the most common. The form can manifest as contract research, patenting and licensing agreements, cooperative research projects, equity holding in companies by universities or faculty members, exchange of research materials, joint curriculum development, joint research programs, and training programs for employees (Ankrah & AL-Tabbaa, 2015). One example of this collaboration type is between the California Institute of Technology (Caltech) and the Boeing Company, a partnership called the Caltech Boeing Strategic Agreement. To aid their development of technology, Boeing has signed long-term agreements with nine research universities, Caltech being one of them. Boeing has provided significant investment in Caltech via research funding, technology transfer and patenting, student internships and career pathways, faculty engagement, and employee/faculty exchange programs (University-Industry Demonstration Partnership, n.d.). This highly integrated form of collaboration involves many formal activities between the two parties and requires both parties to work closely with each other.

However, a high-engagement form of UIC can sometimes devolve into a lower-engagement form of UIC, or the collaboration may end entirely. That is, merely building an engaging form of UIC does not guarantee a long-term and successful collaboration. An example of this is the case of Syracuse University and JPMorgan Chase. In 2007, the university and bank started working together toward shared objectives (Syracuse School of Information Studies, 2007). The four initial objectives for collaboration included building a sustainable UIC model that would transform the approaches by which technologists are trained in the classroom and on the job, promote innovation in university education and financial services technology, and create long-term value to the university, bank, and broader community. In order to achieve these objectives, Syracuse University and JPMorgan Chase launched joint applied research projects. The bank also opened an information security research center at the university. These research collaborations influenced the university's curriculum design and engaged students and faculty members in applied research. JPMorgan Chase recruited many students from these collaborative programs. Although the two parties made efforts to build a long-term collaborative relationship, most of their collaborative projects ended in 2015 (Moriarty, 2015). For now, the partnership relies primarily on personal informal relationships among faculty and bank personnel, with the student

recruitment and employment pipeline program being the only remaining formal arrangement. Partners rarely expect to engage in collaborations which start with a high level of engagement but end up with a low level of engagement, like the partnership between Syracuse University and JPMorgan Chase; the desire is to sustain a high level of engagement. Other collaborations start with a low level of engagement which shifts to a high level of engagement. This low-to-high engagement indicates a sustainable collaboration that is beneficial to both parties.

Determinants of Successful Collaborations

The literature identifies many determinants of successful partnerships between universities and industry. Several studies have tested hypotheses regarding the impacts of different partner dynamics, such as previous links, commitment, the reputation of organizations, intellectual capital, and resources (Bozeman et al., 2013). We considered these factors and others in developing a scorecard framework. Discussed here are five common themes found in the literature: goals, degrees of formalization, trust between partners, duration, and proximity to partners.

Goals

In terms of goals and outcomes, the research highlighted a distinction between knowledge-focused partnerships and property-focused partnerships (Bozeman et al., 2013). These two perspectives are significant to the activities and management of collaborative relationships. While the former is focused on expanding basic knowledge and often involves producing measurable deliverables in the form of co-authorship or patents, the latter has a broader focus on how partnerships can make meaningful contributions to the innovation process and produce economic value. Property-focused efforts can serve to produce significant gains in systems optimizations, increased citation rates on publications from researchers, and cost savings both for the university and partner organizations (Bozeman et al., 2013). However, knowledge-focused efforts are less encumbered by output measures for success—instead focused on research for the sake of producing new knowledge—and this has proven highly relevant and beneficial to the innovation process (Welsh et al., 2008). While one might assume that industry is primarily motivated by property-focused outcomes such as patents or profitable products, Caloghirou et al. (2003) show that industry partners often are motivated by less targeted work aimed at generally enriching the knowledge available to them.

Formalization

The degree of formalization can be interpreted by the institutionalization of official policies and how the relationship links are maintained. The more rules, administrative procedures, and regulations present in the cooperative agreement the more formal it is (Mora-Valentin et al., 2004). While some partnerships are developed in an ad hoc manner with loose management structures, those that dedicate more attention to planning and the organizational structure of partnerships have demonstrated better results during technology transfer (Geisler, 1995).

Trust

Research on collaboration consistently finds that the value of partnerships increases at the speed of trust. Mora-Valentin et al. (2004) studied ten organizational and contextual factors and found that trust and commitment were the most outstanding features in determining the success of research and development agreements. In their study, individual researchers were more likely to be satisfied and seek to evolve the relationship if there was trust and commitment between partners. Establishing trust is fundamental to the health of the partnership and can be achieved by fostering high levels of engagement, establishing clear protocols around protecting the interests of each partner and team member, as well as providing equitable access to partnership resources.

The chances of success in partnerships increase when issues of knowledge appropriation are addressed head-on (Caloghirou et al., 2003). While it is common for companies to protect proprietary information, sometimes these efforts can result in a loss of trust with university partners. Finding a balanced approach to knowledge appropriation should deemphasize the importance of raising revenue, and instead focus on the potential to commercialize and further develop the product (Welsh et al., 2008). Collaborators can do this by proactively creating policies on resolving conflicts of interest and disputes as well as establishing property protection mechanisms to safeguard researchers' work from opportunistic behaviors (Welsh et al., 2008).

Duration

The motivations and goals of the partnership have a heavy bearing on the length of the cooperative agreement. Bozeman et al. (2013) found that industries are less likely to partner with universities if projects are designed to be short term. However, that does not mean short term collaborations are impossible; sometimes they

make sense for the goals of the project. For example, if an organization is seeking to create a new patent or publish a paper then it is likely that the partnership will come to a natural end shortly after the outcome is achieved. Regardless of the formal endings of these associations, partners should invest in the continuation of their relationships into the foreseeable future. Pertuzé et al. (2010) argue that this is a best practice for UICs. They suggest that companies should invest in long-term relationships with universities and plan for multi-year collaboration. Similarly, relationships between individual researchers should also be long-term and focus on strengthening relationships (Pertuzé et al., 2010).

Proximity

Proximity can describe physical distance as well as “distance” between the bodies of knowledge brought to bear on the collaborative projects. Partnerships that reach across fields and geographical boundaries have been shown to positively impact the collaboration process. However, too much deviation between the focus of collaborative research and the core competencies of the partner organizations can cripple the collaboration process (Caloghirou et al., 2003). When distance is a factor, studies highlight that face-to-face communication between teams is essential for the success of the project. Amabile et al. (2001) reported that increased physical distance could be a barrier to success and highlighted the importance of physical presence/proximity in the collaboration process.

The University Partnership Design Scorecard

Scorecard Framework

Based on our literature review, we developed a new partnership scorecard designed to fit the needs of a university. This scorecard is designed to help practitioners to monitor, evaluate, and improve the university’s partnerships and collaborations. The scorecard consists of three separate surveys, one for each stage of the partnership: the establishment phase, the operation phase, and the delivery phase (Kraut et al., 1987). Each survey consists of a distinct set of questions, which should ideally be considered during the corresponding phase of the partnership. However, the surveys can be completed retroactively; a partnership that is well into the operation phase can take both the establishment and operation phase surveys, and each will offer unique guidance on how to improve the effectiveness of the partnership.

Within each of the surveys, questions are grouped into three areas: institutional factors, team factors, and goals and output. These three groupings emerged from the literature, and are similar to the three main attribute categories found in the literature by Bozeman et al. (2013, p. 6):

1. **collaborator attributes**—corresponds to the team factors
2. **attributes about the collaboration in general**—corresponds to goals and outputs
3. **specific organizational or institutional attributes**— corresponds to institutional factors

Since the goal of this scorecard is to be actionable, an attempt was made to develop groups which correspond to domains of possible action—if, say, a partnership’s overall score is brought down by low scores in the institutional factors groups of questions, then the partnership team knows they need to focus their efforts on improving how the two partner institutions act.

The questions are all phrased as positive statements of best practice (e.g., “the partnership provided valuable training opportunities for students”), and responses are given on a seven-point scale, ranging from “strongly agree” to “strongly disagree.” What is being measured is essentially the extent to which the partnership adheres to best practices. Not all questions are applicable to all partnerships, though it is expected that most questions will be answerable. The partnership’s score is calculated by adding up the numerical value of all the answers given (strongly agree = 6; strongly disagree = 0), and dividing by the number of questions which had been answered, and multiplying by 16.67. This gives a score between 1 and 100. From initial tests, it is expected that most partnerships will score an initial score between 50 and 85, which indicates that the scorecard does identify room for improvement. The minimum score that indicates overall alignment with best practices is a 66, which results from answering at least “somewhat agree” to all questions. However, attention should be paid to a partnership’s score per section: for example, a high score in institutional factors could balance out a low score in team factors, thereby leading to a passible overall score but obfuscating possible areas of improvement.

The scorecard also includes a shortlist of quantitative metrics, which are assessed during or after the delivery phase (e.g., “number of peer-reviewed journal articles which resulted from the partnership”). These metrics are less useful for assessing the effectiveness of the partnership because there are many reasons why, say, one partnership might lead to more journal articles or tech transfer

Table 21.1 The Structure of the Proposed Partnership Scorecard

	Establishment Phase	Operation Phase	Delivery Phase	Quantitative Metrics
Institutional Factors				
Team Factors				
Goals & Output				

contacts than another. Nonetheless, these metrics are useful for assessing the university's overall partnership strategy.

The general form of the scorecard is shown in Table 21.1.

Scorecard Use—Consultant Model

The tool is simple to use and easy to access, and so it could be made available to partnership teams for use in self-assessment. However, if the results are to be used to compare and assess a university's many partnerships, there must be some degree of standardization in how the tool is administered. If the answers are self-reported, it is possible that the results will be skewed by team members not wishing to report on problem areas, or by the team member who fills out the scorecard having a different perspective than the rest of the team. Results could also be skewed by variation in how individuals judge their adherence to best practices—one person's "somewhat agree" could be comparable to another person's "strongly agree."

Therefore, our suggestion is that the scorecard be administered by a single individual (or group of individuals, if need be) who uses the scorecard to assess all partnerships within the university. For our purposes, we will call this person a consultant. When it is decided that a particular partnership will be assessed, the consultant imbeds themselves within the partnership for a few days to a week (not necessarily concurrently), interviewing team members and observing the partnership's operations. The consultant then fills out the scorecard for the partnership and compiles a report for the partnership team, which includes the partnership's score and suggestions for how to improve the effectiveness of the partnership (based on areas where the partnership scored poorly). Once the consultant has compiled several of these reports, they will begin to build a body of knowledge about what makes a successful partnership. At that point, the consultant will be able to work directly with struggling partnerships on improving their operations.

The scorecard assessment could be made available as an optional service for partnerships that wish to improve their operations, or it

could be required as a pre-requisite for the partnership to advance or be formally recognized by the university. For example, a policy could be put in place to require that a partnership score at least a 70 in order to receive funding through the university. Ideally, the partnership team would have the support of the consultant in ensuring that they are able to achieve this minimum score, which would help the scorecard assessment be seen as a useful way to ensure the partnership's success instead of unnecessary red tape.

Another important role of the consultant is to document university-specific best practices and incorporate them into the scorecard. Successful partnerships should be acknowledged and probed for insights that can be used to improve the scorecard. Although the scorecard tool is based on our extensive literature review, the literature does have gaps (for example, little is said about university–university partnerships), and each university environment is unique. In order for the scorecard to be as effective as possible, it needs to be constantly improved to better fit the needs of the university where it is being applied.

Conclusion

Due to the decrease of government funding for higher education in recent decades, as well as new policies which encourage universities to be more active in the market (largely by patenting and licensing technologies), universities have increasingly engaged in partnerships with other organizations (Ankrah & AL-Tabbaa, 2015; Hagedoorn et al., 2000; Perkmann & Walsh, 2007; Poyago-Theotoky, 2002). At the same time, performance management trends have been embracing the value of diversity in the innovation process. Collaboration efforts are increasingly transdisciplinary, involving actors from other areas of study and other geographic areas. Partnerships between universities and other organizations have been recognized for their ability to reduce costs for both partners, increase enrollment, achieve research outcomes, and advance the commercialization of technologies.

There are many factors related to successful partnerships. The most common themes that emerged from our study related to establishing thoughtful goals, pursuing formalization of the partnerships, establishing trust, aiming for long-term partnerships, and creating teams based on proximity (both physical proximity and disciplinary proximity). Additionally, how an evaluative procedure is designed and executed, and whether the metrics are reviewed regularly, can impact the success of the partnerships. It should be noted that other potentially critical factors exist that have yet to be addressed in the literature. For example, studies have not widely

explored the effects of external resource providers on the outcomes of university partnerships. We have built our scorecard based on the best practices identified in the literature, but it is and always will be incomplete. We intend this scorecard to be a living tool—as it is used, it will be improved, and it will hopefully become more useful as time goes on.

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Table 21.2 Partnership Scorecard Framework

Scorecard			
	Initiation Phase	Operation Phase	Delivery Phase
Institutional Factors	The partner institutions share similar institutional goals	The team has the institutional support necessary to seize opportunities should they arise	The partnership's outcomes advanced the organizational strategy of both partner organizations
	The partner organizations understand each other's institutional goals	The partner institutions are willing to adjust priorities as project evolves	Students and faculty involved in the partnership were exposed to practical problems and new ideas
	The partner institutions share similar institutional visions	The team has access to adequate resources	Problems / ideas from the partnership were incorporated into the curricula taught at ASU
	The partner organizations understand each other's institutional visions	The team has the institutional support necessary to take advantage of outside resources should they become available	The partnership provided valuable training opportunities for students
	The partner institutions have compatible interests	The team is able to access necessary equipment	The partnership provided valuable professional development opportunities for ASU staff and faculty
	The partner institutions understand each other's interests	The team is able to access necessary expertise	Non-ASU partner's ability to innovate was improved by engaging in this partnership

(Continued)

Table 21.2 (Continued)

Scorecard		
Initiation Phase	Operation Phase	Delivery Phase
The partner institutions understand each other's reasons for engaging in the partnership	The project retains the support of top management / leadership of both partner organizations	ASU's ability to innovate was improved by engaging in this partnership
The partner institutions are aware of each other's pre-existing relationships with other organizations	All team members are incentivized to contribute to the project	The partnership improved the public's opinion of both partner organizations
Partner institutions are aware of each other's political context	Sensitive information is treated similarly by both partner organizations	
Partner institutions are aware of each other's social context	Confidentiality agreements have NOT hindered the necessary dissemination of knowledge	
Partner organizations are aware of each other's economic context	Senior leaders of both collaboration partners (i.e. company board or senior academic faculty) interact regularly	
The partnership's organizational structure is well-defined	Partner organizations inform each other of relevant developments within a reasonable time frame	
The partnership's organizational structure was established with input from both institutions	Partner organizations communicate with each other openly and honestly	
Administrative responsibility for the partnership is clearly defined	Academic integrity and research ethics are respected by both partner organizations	
Administrative responsibility for the partnership was established with input from both institutions		
The interests of both partners are protected by contractual safeguards		
Official Intellectual Property agreement was signed before work began		
Communication between partner institutions is open and honest		

(Continued)

Table 21.2 (Continued)

Scorecard		
Initiation Phase	Operation Phase	Delivery Phase
Partner institutions engage in frequent and regular communication		
Partner organizations are transparent about their goals for the partnership		
Partner organizations are transparent regarding intellectual property policies		
Partner organizations are transparent regarding knowledge sharing policies		
The partnership's resource needs were estimated before work began		
The partnership's resource needs were acknowledged by both institutions before work began		
Resources required for the partnership were allocated before work began		
The expected resource contribution of each partner institution is clearly defined		
The expected resource contribution of each partner institution was established with input from both institutions		
Responsibilities of each partner institution are clearly defined		
Responsibilities of each partner institution were established with input from both institutions		
Senior leaders of both collaboration partners (i.e. company board or senior academic faculty) interact regularly		
The role of each partner institution is clearly defined		

(Continued)

Table 21.2 (Continued)

Scorecard			
	Initiation Phase	Operation Phase	Delivery Phase
	The role of each partner institution was established with input from both institutions		
Team Factors	The partnership team is willing to adopt formal rules	Team leadership is able to manage instability and change	All team members would feel comfortable attending events hosted by either partner organization
	Team members understand and accept cultural differences between industry and academia	Team leaders are able to adapt leadership style to fit the needs of the team	Strong personal relationships were built between team members from different partner organizations
	Team members are open to utilizing approaches they are not familiar with	Team leadership is able to manage the interests of both partner organizations	The partnership built trust between academic researchers and industry practitioners
	Team members bring diverse, complementary skills to the project	All team members follow through on promises	The partnership provided team members with access to a useful professional network
	Team members share a common core of knowledge	All team members feel that they can trust each other	
	Team members have the capacity to engage in collaboration without sacrificing the quality of their work in other areas	All team members have compatible values	
	Team members bring intrinsic motivation to the project	Team members have interpersonal familiarity	
	Team members have experience working as part of a collaborative team	All team members respect each other	
	There is a clearly established team leader	Team members communicate with each other openly and honestly	
	Team members possess compatible problem-solving styles (Kirton Adaption Innovation Inventory)	Academic integrity and research ethics are respected by all team members	
	An official conflict resolution process was put in place before work began	The unique capabilities of each team member are acknowledged and utilized	

(Continued)

Table 21.2 (Continued)

Scorecard			
	Initiation Phase	Operation Phase	Delivery Phase
	There is agreement among the team about how conflicts will be resolved	Team meetings are held regularly	
	Team members are aware of project's political and economic context	Relevant information and agendas are distributed to all team members before each meeting and event	
	Team members are aware of all intellectual property or knowledge-sharing agreements established between partner institutions	Team effectiveness is examined on a regular basis	
	Core team members reside in the same geographic area	Conflicts within the team are dealt with professionally	
Goals and Outcomes		Team members do NOT attempt to impose their own conventions and approaches on other team members nor on the team as a whole	
		Projects engage with the communities that they are embedded within	
	The team is highly knowledgeable about the field in which the partnership will be working	Roles and responsibilities of each team member are clearly defined and articulated	The team became more knowledgeable about the fields in which the partnership did work
	The purpose of the partnership is clearly defined	Benchmark goals are realistic	Partnership deliverables met time, cost, and quality requirements
	The purpose of the partnership was established with input from both institutions	Tensions between academic rigor and industrial/commercial relevance are noted and are resolved	Partnership outcomes will have a positive effect on ASU's operations
	The goals of the partnership are clearly defined	Technologies are advanced toward commercialization at a speed acceptable to both partner institutions	Partnership outcomes will have a positive effect on the non-ASU partner organization's operations
	The goals of the partnership were decided with input from both institutions	Team members feel comfortable reporting failures and negative results	The partnership led to the creation of new or improved products / processes

(Continued)

Table 21.2 (Continued)

Scorecard		
Initiation Phase	Operation Phase	Delivery Phase
The goals of the partnership are realistic		The partnership produced use-inspired research
Specific project milestones have been agreed upon		The team was able to openly and honestly report all research results
Measures/indicators of the partnership's success have been agreed upon		Research results advance fundamental knowledge about the world
Ownership of any patents which result from partnership was decided before work began		Research results are useful for solving real-world problems
Both partners' expectations regarding knowledge ownership are clearly articulated		Proprietary information remained under control (was not leaked)
Both partners' intentions regarding the application of project results are clearly articulated		All technology transfer processes were completed
It has been decided under what conditions results will not be published in academic journals / publishing will be postponed (i.e. until patent is awarded)		The partnership provided a 'test bed' for refining academic ideas/theories
		The partnership stimulated research activities
		The partnership stimulated the development of new technologies
		The partnership served the community
		The partnership contributed to local/regional economic development
		What best practices were developed during this partnership that could assist future ASU partnerships?
		What factors contributed most to this partnership's success?
		How could this partnership have been improved?

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