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The governance of inter-firm co-development projects in an open innovation setting

Abstract

Purpose - This paper examines the governance of inter-firm co-development in an open innovation setting and shows how a stage-gate product development process can be used to support this relationship.

Design/methodology/approach - We adopt a qualitative case-study approach informed by ethnomethodology. Data was obtained via semi-structured interviews and document analysis.

Findings - We found that in an open innovation setting - where the producing partner relies on a research partner for all product development activities - a stage-gate product development process can act as a governance mechanism as it enables the development of trust and cooperation which supports the co-development relationship.

Research limitations/implications - The implication of this finding is that a stage-gate process can be a flexible governance mechanism, which can adapt over time in relation to the needs of the co-development partners in an open innovation setting. This also lays the groundwork for future research to explore the applicability of this tool in other settings e.g. outsourcing arrangements as well as help guide the design and implementation of future governance mechanisms.

Originality/value - In the context of accounting research, this paper helps practitioners and academics understand how a stage-gate process can be used as a governance mechanism to manage and control co-development projects in an open innovation setting.

Keywords Governance, Open Innovation, Co-development, Stage-gate

Paper type Research paper
1. Introduction

Innovation management is undergoing a makeover with research showing that organisations are examining how they can improve their performance by leveraging from the expertise of external partners (Chesbrough, 2003; Enkel et al., 2009). Unlike traditional external sources of innovation such as suppliers who undertook specific and clearly defined innovation activities, this new approach, referred to as ‘open innovation’, involves new types of inter-firm arrangements for the co-development of new products (Chesbrough and Teece, 2002; Chesbrough, 2003; Van de Vrande et al., 2009; Gassmann et al., 2010; Van der Meer-Kooistra and Scapens, 2015).

There is an increasing amount of research in the accounting literature on the management control issues around the development of new products (see for example, Davila, 2000; Hertenstein and Platt, 2000; Bisbe and Otley, 2004; Akroyd et al., 2009; Davila et al., 2009; Jørgensen and Messner, 2009; Akroyd and Maguire, 2011; Akroyd et al., 2016). Similarly, accounting research examining inter-firm relationships is expanding (see for example, Caglio and Ditillo, 2008; Dekker, 2008; Anderson and Dekker, 2010; Ding et al., 2013). This research, however, is focused on fixed term contractual relationships that are transactional in nature, even though in practice collaborative relationships based on open innovation are increasing in popularity (Chesbrough et al., 2006; Gassmann et al., 2010; Teece, 2007). Thus, it is important to examine the governance of inter-firm co-development projects in an open innovation context (Van der Meer-Kooistra and Scapens, 2015).

Following Van der Meer-Kooistra and Scapens (2015: pp. 70) we use the term ‘governance’ in this paper because “management control can be a problematic concept as it implies a relationship between a superior and a subordinate” while inter-firm “relationships… are relationships between equals who have to ‘control’ or more appropriately ‘govern’ themselves.”

The accounting literature has shown that a stage-gate process\(^1\) is a common control mechanism used to manage internal new product development (NPD) projects (Hertenstein and Platt, 2000; Akroyd and Maguire, 2011). Grönlund et al., (2010: pp. 107) argue that “firms can benefit from opening up the NPD process by integrating the principles of open innovation with the well-known and widespread stage-gate process for organizing NPD.” While Grönlund et al.,

\(^1\) We use the term “stage-gate” in a generic way to signify the different development stages and decision gates that take place during the product development process.
(2010) have integrated open innovation into the stage-gate process we aim to show how this process can also influence inter-firm governance issues.

Using an ethnomethodology informed case study, we examine a co-development project between a fruit cultivar marketing company - FruitCo (a pseudonym) - and a cultivar research company - ResearchCo (a pseudonym) - with the aim of understanding how FruitCo managers simultaneously control product co-development projects as well as the inter-firm governance requirements using their stage-gate product development process.

We found that FruitCo’s stage-gate process enabled the development of trust and cooperation which supported the inter-firm co-development relationship. We show that early in the inter-firm relationship the stage-gate process enabled trust between the partners to develop as it promoted goal setting activities which facilitated goal congruence. As the co-development relationship matured the stage-gate process also enabled information sharing between the co-development partners as it promoted project management which facilitated uncertainty reduction.

In the following sections we present our research approach, a description of our case study site FruitCo, the structure of FruitCo’s innovation function, an overview of the co-development project, and a discussion and conclusion of our findings.

2. Research Approach

The aim of this paper is to examine the management of FruitCo’s co-development projects so as to better understand the governance of co-development NPD projects in an open innovation setting. To do this we use an ethnomethodology informed case study (see for example Akroyd et al., 2016 and O’Grady & Akroyd, 2016). Our ethnomethodology research approach is informed by Garfinkel (1967, 2002, 2006) and “is concerned with how members of a society go about the task of seeing, describing and explaining order in the world in which they live” (Pollner, & Emerson, 2001, p. 126).

Following this approach, we carried out 10.5 hours of semi-structured interviews with all six employees involved in innovation activities at FruitCo (see Figure 1 on page 6) as well as a team leader (manager) at its co-development partner ResearchCo to understand how they saw, described and explained how order was created in this open innovation setting (see Table 1
below for details). In addition, we collected and analysed internal and external documents such as company reports, strategy documents, project plans and progress reports referred to by organisation members during the interviews.

Table 1: Case Study Data

<table>
<thead>
<tr>
<th>FruitCo interview data (6 members)</th>
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<tbody>
<tr>
<td>Innovation Leader A</td>
<td>2 hours</td>
</tr>
<tr>
<td>All Three Innovation Leaders and the Innovation Manager</td>
<td>1 hour</td>
</tr>
<tr>
<td>Innovation Manager</td>
<td>2 hours</td>
</tr>
<tr>
<td>Head of Innovation (Executive Manager)</td>
<td>1.5 hours</td>
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<tr>
<td>Innovation Coordinator (Administration Staff)</td>
<td>1 hour</td>
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</table>

<table>
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<tr>
<th>ResearchCo interview data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Team Leader (Manager) – person in charge of collaboration</td>
<td>3 hours</td>
</tr>
<tr>
<td>with FruitCo</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Documents collected and analysed</th>
<th></th>
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<tbody>
<tr>
<td>FruitCo Vision Statement</td>
<td>2 pages</td>
</tr>
<tr>
<td>FruitCo Mission Statement</td>
<td>1 page</td>
</tr>
<tr>
<td>FruitCo Innovation Project Descriptions</td>
<td>24 pages</td>
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<tr>
<td>FruitCo Key Performance Indicators for Innovation leaders</td>
<td>2 pages</td>
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<tr>
<td>FruitCo Innovation Strategy</td>
<td>2 pages</td>
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<tr>
<td>FruitCo Innovation Plan</td>
<td>2 pages</td>
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<tr>
<td>FruitCo 5 year Outlook</td>
<td>47 pages</td>
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<td>FruitCo Annual Reviews</td>
<td>51 pages</td>
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<tr>
<td>FruitCo Annual Reports</td>
<td>61 pages</td>
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<tr>
<td>FruitCo System Documentation</td>
<td>2 pages</td>
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<tr>
<td>FruitCo Supply Chain</td>
<td>2 pages</td>
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<tr>
<td>FruitCo Production Cycle</td>
<td>1 pages</td>
</tr>
<tr>
<td>FruitCo Group Ltd Prospectus</td>
<td>71 pages</td>
</tr>
<tr>
<td>ResearchCo Annual Report</td>
<td>52 pages</td>
</tr>
<tr>
<td>ResearchCo Report titled ‘Discover, Innovate, Grow’</td>
<td>36 pages</td>
</tr>
</tbody>
</table>

2 It should be noted that Garfinkel developed ethnomethodology in the 1950s and 1960s and many of the papers in his book titled “Studies in Ethnomethodology” (1967) were based on single interviews or on document analysis. This view is supported by Sharrock & Anderson (2012, p.107) who argue that ethnomethodology “does not have the kind of concern for methods of data collection which are so prominent in the methodological literature.”
3. FruitCo Description

FruitCo is a New Zealand (NZ) company that has established a unique brand name, which sets the benchmark for excellence in its market. The company is governed by legislation which defines the scope of activities that FruitCo is allowed to undertake and specifies what they can and cannot do. For example, the company is limited to only dealing with one particular fruit. They cannot market any other type of fruit even though it might be distributed through the same pack-houses. Hence, FruitCo has a specified function. It does marketing, distribution management, innovation and supply chain management for the farmers in its market. It does not deal with any other fruit nor does it grow, pack, transport or distribute the fruit. While all of FruitCo’s functions are deemed to be important, innovation is seen as the cornerstone for their success and the key driver of future growth. Examples of innovation at FruitCo include developing new cultivar varieties, developing new ways to use the fruit’s great taste and health benefits, finding new markets and customers, designing quality assurance processes, improving orchard management and improving environmental growing methods.

4. Structure of Innovation Function

Prior to 2004, FruitCo’s innovation function operated as a separate company. The primary responsibility of the company was to build knowledge and capacity of on-going industry development that would maximize returns for the growers. The company attempted to do this through in-house research and development (R&D), which as outlined by the relevant legislation was limited to just those innovation activities directly related to planting, marketing, and distribution of the specified fruit. According to the Head of Innovation at FruitCo;

“They tried this model for about three years but it did not work. It was definitely antagonistic to the research community in New Zealand. It cannot have a significant skill set on tap just working in [this area]”

In early 2004, this recognition led to a modified innovation model based on an open innovation approach where the aim was to get external partners to do the R&D activities for the firm. This was managed by a small internal innovation team employed by FruitCo. As explained by the Innovation Manager;
“There were many drivers for [FruitCo] to move to an open innovation model which included access to external world-class research that was not available otherwise; greater flexibility of research being investigated; alignment between [FruitCo] and external research activities; and greater ease of scaling up or down existing R&D work on set targets”.

FruitCo’s innovation function under the new model consisted of a Head of Innovation, an Innovation Coordinator and an Innovation Team comprising an Innovation Manager and three Innovation Leaders as shown in Figure 1.

**Figure 1: FruitCo's Organisational Structure**

The innovation team looked after the innovation portfolios and managed the steering groups which were small cross-functional project teams setup to manage the individual projects. A project steering group had a project champion (either an internal or external person) whose role was to defend the logic of the project from a technical perspective. The group generally had a business champion who was an internal person such as the Head of Innovation or an operations person whose role was to defend the logic of the project from a business perspective and to
ensure the project was not cut from the budget. This person also provided the information link to other functions of the organisation so that everyone knew what was going on. The group also included a marketing person, a supply chain person, and an Innovation Leader who was responsible for managing the project from a funding perspective. It also had relevant external people e.g. scientists that were involved in the project. This group was expected to review the projects as they were carried out. The steering group convened several times over the life of a project to ensure it was comfortable with all facets of the project, including the costs being incurred.

The structure of the innovation function meant that part of the innovation team’s role was to manage the inter-firm relationships to prevent the projects from failing. To understand how the technicalities of the project and inter-firm relationships were managed simultaneously, we examined one of FruitCo’s co-development projects, the new cultivars programme, and the corresponding relationship with an external partner, ResearchCo as discussed in the following sections.

5. Inter-Firm Co-Development Projects

FruitCo’s innovation projects around new cultivars generally started with market research that was done by marketing consultants hired by FruitCo. These consultants identified opportunities in the market based on consumer tastes and preferences, distribution requirements, and consumer behaviour. FruitCo took the information from the consultants and formulated innovation strategies, stating the opportunities it would like to pursue. These strategies were discussed with the relevant people and the new cultivars programme was undertaken in five stages as shown in Figure 2.

The new cultivars programme is a classic example of FruitCo’s collaborative innovation process, which was divided into project stages and gates. During the different stages, FruitCo contracted external partners such as market research firms, universities, or research institutes to perform the R&D activities necessary for the project. While at the gates, decisions on whether the project should progress to the next stage were made by project steering groups.

The key inter-firm relationship that FruitCo had for developing new products (cultivars) was with ResearchCo, a New Zealand government-owned research institute that is globally known for the development of new fruit cultivars.
5.1. Collaboration with ResearchCo

In March 2004, FruitCo entered into an operating agreement with ResearchCo to develop new cultivars. The terms of this agreement made ResearchCo, FruitCo’s exclusive provider of breeding, its principal provider of research services, and a key strategic partner. However, the agreement did not restrict either of the organisations from collaborating with other external partners. For instance, FruitCo did not have to use ResearchCo to carry out research. Similarly, ResearchCo could work with other industry players if there was a benefit to the New Zealand industry.

Figure 2: Stages of New Cultivars Programme
The Head of Innovation at FruitCo suggested that it was beneficial for FruitCo when ResearchCo worked with other industries;

“It expands the skill set applied to the project and it exposes both groups to other’s knowledge and views of the world resulting in more robust projects and synergies between both research parties.”

Furthermore, as stated by one of FruitCo’s Innovation Leaders;

“When [ResearchCo] works with other industries, it means that someone else is helping keep [ResearchCo] alive not just FruitCo.”

Thus, ResearchCo was not solely dependent on FruitCo and FruitCo gained the benefits of working with ResearchCo without bearing all their overhead costs.

FruitCo’s Head of Innovation as well as the Innovation Manager explained that there were two key concerns at the start of the co-development relationship. Firstly, FruitCo organisation members feared that as they were not in control of the personnel used by ResearchCo, the innovation team could end up with higher costs than were otherwise necessary and not achieve adequate outcomes. Since the innovation team were accountable for their innovation budgets, they were not comfortable taking the risk. Secondly, the organisation members at FruitCo were concerned that the information about the new cultivars would be leaked to competitors, for example, foreign competing farmers might capitalise on the information before FruitCo got patents for the new cultivars.

In response to these concerns, FruitCo’s Innovation Leaders used a number of prescribed operational rules and procedures to manage the innovation projects they were involved in with ResearchCo. These included requesting detailed written reports at each stage of the project, setting tangible milestones that were closely monitored by Innovation Leaders throughout the project, and having detailed meetings before a project started to outline FruitCo’s expectations, followed by regular review meetings to get feedback on the progress of the projects. The interviewees explained that the purpose of these measures was to closely monitor the activities of ResearchCo organisation members and ensure FruitCo’s project objectives were achieved. However, the intensity of the rules and procedures were counter-productive for the relationship
as they attracted resistance from the ResearchCo organisation members. The Team Leader at ResearchCo described the intensity of these procedures with the following example;

“Say you have a contract with FruitCo to deliver 19,000 plants that ResearchCo has said ok we will deliver 19,000 plants. FruitCo actually sent someone to come and count that there are 19,000 plants.”

These extreme measures made FruitCo organisation members’ lack of trust obvious to the ResearchCo organisation members who viewed it as overly protective and their willingness to work with FruitCo began to diminish. As explained by the ResearchCo Team Leader, the organisation members at ResearchCo did not need nor appreciated that level of monitoring. They argued that instead of such a close monitoring approach, if FruitCo just trusted the ResearchCo organisation members, they would feel more comfortable and willing to be more cooperative.

However, as explained by the Innovation Manager, the deteriorating relationship was salvaged through a change in FruitCo’s management approach instigated by the intervention of FruitCo’s Chief Executive Officer (CEO). One of the main changes was the appointment of a designated Innovation Leader (later called the “Innovation Manager”) in 2005 to be solely responsible for the dealings with ResearchCo in the new cultivars programme. One of the key performance indicators of this role was focused on “ResearchCo value extraction”. This change moved the accountability for the success of the collaborative relationship to the responsible Innovation Leader. Through this change, pressure was put on the Innovation Leader to make the relationship work so that both firms could benefit. These changes were also reciprocated by ResearchCo’s executives. Similar to the FruitCo Innovation Leader, the ResearchCo Team Leader for this fruit was given the responsibility of ensuring the relationship was effectively sustained.

These changes resulted in both the responsible organisation members putting in extra effort to restart the relationship building process. They interacted with each other on an increasingly social basis to learn more about each other’s activities to determine how best to make the relationship work in an effective manner. In their interviews, both these personnel suggested that this increased interaction resulted in an increase in the level of perceived trust, which they continued to share at the time this research was carried out in 2010. The change they observed was summed up by one of the Innovation Leaders with the following comment;
“[ResearchCo] has gone from being a service provider to now having a shared vision and looking to deliver value to the greater industry.”

This change was an indicator of the high level of trust building between the members of both organisations, which helped reduce the uneasiness of collaborating with an external party initially felt by FruitCo’s innovation team. The most apparent consequence of this change as described by the ResearchCo Team Leader was the variation in FruitCo innovation team’s approach to managing the activities of the relationship, which start to change around 2006-2007. He explained that as the relationship matured over the years, FruitCo organisation members reduced their level of monitoring. For instance, FruitCo no longer sent someone to count the number of plants to ensure ResearchCo was not cheating. Instead, as explained by FruitCo’s Innovation Leaders, they believed that ResearchCo organisation members were working ethically as both organisations were now working towards a common goal: advancing the fruit industry in New Zealand to maintain and grow their global market share while earning good returns for the growers. However, one tool that continued to be consistently used since the start of the relationship was the stage and gate process discussed below.

5.2. Stage-gate process

FruitCo applied a stage-gate process to the new cultivars programme and divided the innovation process into a series of stages that were followed by gate reviews where decisions were made on whether the potential variety should proceed to the next stage. The Innovation Manager explained that they approached each stage of the new cultivars program as a series of individual projects, which were again divided into stages followed by gate reviews as illustrated in Figure 3 using the third stage of the program. According to the Innovation Manager, they started the process by bringing together the steering group including the co-developers and their initial discussions centred around;

“What's gone well in the past, what needs to be improved, what facets do we need to add, what activities need to be done.”
The output of this discussion was a project plan which included the project timeline, budget, project description and an outline of the components of the project to be carried out by external providers e.g. at the clonal stage these were ResearchCo, FF (a company involved in consumer behaviour and nutritional research) and the growers whose sites were used for the trial. The following process was described by the Innovation Manager as follows:

“We effectively work out and scope each of the components and then we budget for each of the components, what activities they have, we breakdown a bunch of milestone payments for each of the components and each of the parties as to how much they will receive when each component is agreed to, what the deadline is for those components. What is the actual deliverable? We try to ensure that the deliverable is not a ghost milestone but it is something physical and tangible that we will physically see e.g. data received from [ResearchCo] in an excel spreadsheet and the deadline for that...So making it a tangible milestone.”
These details were included in the project plan which was reviewed by FruitCo’s Board. Once approved, the plan guided the rest of the stage as well as the collaboration with the external partners. As explained by the interviewees, the management of the components again utilised the stage and gate process where the activities leading to the set milestones operated as stages and the outputs (deliverables) of these stages were reviewed at the gates to establish whether the milestones had been achieved. They referred to these as the “stop/go decisions” which were generally made by the steering group that setup the project. The Innovation Manager explained that the stage-gate process was their main formal project management tool.

We also found that the stop/go decisions at the gates stimulated dialogue between the co-developers prior to the gates as captured by the following quote from the Innovation Manager;

“The reality is that on the side it is all the informal stuff of just good communication. This did not happen and this did happen and what you going to do because this just happened that we did not think about.”

This dialogue drew FruitCo’s attention to issues in a timely manner and allowed for these to be solved prior to the gates and formal reviews to ensure viable projects were not stopped at the gate. The informal dialogues also contributed to the establishment of more trust and better relationships between the co-developers. The ResearchCo Leader suggested the result of this was that they were able to more openly communicate with FruitCo on not just the matters relating to specific projects but also ideas that could be of benefit to FruitCo. He suggested that the strengthening of the relationship translated to an increased number of meetings between ResearchCo and FruitCo’s innovation team that were more interactive in nature with discussions centring on strategic uncertainties, resolution of potential problems and ideas that could be potential innovation projects. The Head of Innovation also mentioned the strengthening relationship stating that;

“The reality is that we are increasingly having a very big part to play in decisions relating to where [ResearchCo] spends their fundamental money in [fruit]. We now have a very strong relationship.”
6. Discussion and Conclusion

This paper shows how the governance changes in FruitCo enabled it to sustain the use of co-development practices for its innovation function in a number of ways. The evidence showed that a change to the open innovation model was initiated by FruitCo through changes to the firms’ governance. Initially these included changes to the company’s organizational structure which led to changes in project management and enabled them to seek and incorporate external knowledge into their innovation projects.

FruitCo’s collaborative relationship with ResearchCo showed that over time as the collaborative relationship developed organisation members became familiar with each other’s processes, which led to a shared vision and the alignment of objectives. Aligned objectives meant ResearchCo organisation members were working towards FruitCo’s goals. Hence, the perceived level of risk decreased and organisation members began to trust each other.

With this change in the organisation members’ perspectives, governance also changed. That is, at the start of the relationship in 2004 when the perceived level of risk was high and the perceived level of trust was low, governance was focused on ensuring that the goals and objectives of the inter-firm relationship were achieved. Thus, the focus was on promoting goal congruence. When the relationship matured and the perceived level of trust increased, governance took on an information role. This lead to uncertainty reduction which helped FruitCo manage uncertainties and performance risks.

Management Control research in this area (Davila, 2000; Akroyd & Maguire, 2011) has shown that the uncertainty reduction role of control is important during project stages while the promotion of goal congruence role is important at the decision gates. Our findings build on this knowledge by showing that FruitCo’s stage-gate process worked as an integrating interface between co-developers enabling effective information sharing throughout the life of the cultivar project. The stage-gate process also provided an anchor for the development of the relationship by creating a mechanism for upfront discussions of expectations, milestones, deliverables, and timelines for each stage-gate which improved cooperation and resulted in fewer appropriation issues in later stages of co-development projects. Moreover, despite the work being carried out at ResearchCo’s laboratories by ResearchCo employees, the FruitCo stage-gate reviews allowed for a non-invasive check at pre-determined intervals to ensure projects were on track and that objectives were being met.
These findings contribute to our knowledge of the role that a stage-gate process can play in an innovation context (Akroyd et al., 2016; Akroyd and Maguire, 2011; Akroyd et al., 2009; Bisbe and Otley, 2004; Davila, 2000; Davila et al., 2006; Davila et al., 2009) by examining the governance of an inter-firm co-development project.

From a practical perspective, we provide new insights on how an inter-firm governance structure influenced the changes that took place in relation to the use of open innovation practices. This will help practitioners better understand how the stage-gate process can enable the development of relationships and contribute to improving partner trust and cooperation, which also suggests that the use of stage-gate processes could potentially be applied to activities involving collaborations with external parties other than innovation such as outsourcing or information sharing arrangements. With an increasing number of organisations now engaging in external collaborations, this would be a fruitful area of future research that could provide insights on the design and implementation of ideal governance mechanisms that are flexible yet efficient to facilitate effective collaborative relationships. Future research could also examine other governance mechanisms that aid collaborative relationships and a comparison across different tools could guide the development of better and improved governance mechanisms.

References


