Aligning operational and corporate goals: A case study in cultivating a whole-of-business approach using a supply chain simulation game

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Abstract. This paper outlines the development and use of an interactive computer-based supply chain game to facilitate the alignment of disconnected operational and corporate goals. A multi-enterprise internal cattle supply chain was simulated targeting the operational property managers and the overall impacts of their decision making on corporate goals A three stage multidisciplinary approach was used. A case study based financial analysis was undertaken across the internal cattle supply chain, a participative action research component (developing the game to simulate the flow of product and associated decisions and financial transactions through the internal supply chain of the company for different operational scenarios using measurable and familiar operational and financial criteria as tracking tools), and a qualitative analysis of organisational learning through player debriefing following playing the game. Evaluation of the managers' learning around the need for a change in general practice to address goal incongruence was positive evidenced by changes in practice and the game regarded by the users as a useful form of organisational training. The game provided property managers with practical insights into the strategic implications of their enterprise level decisions on the internal supply chain and on overall corporate performance. The game is unique and is a tool that can be used to help address an endemic problem across multi-enterprise industries in the agrifood sector in Australia.

Keywords: Agribusiness, Business simulation, Computer game, Internal Supply Chain, Organisational learning.

Introduction

Managing a multi-enterprise organisation with distributed geographic locations is complex. A particular concern of senior management is ensuring that the work undertaken by property managers adds value not only to their respective business units but also to the overall organisational viability and profitability (Collis and Montgomery 1997). One of the key issues faced by a business, particularly a multi-enterprise one, is that of managing the internal supply chain effectively (a supply chain being the flow of goods and information necessary for raw materials to be transformed into finished products). In a multi-enterprise organisation, the management of this flow can be difficult as there is the tendency for a disconnect to develop between the goals of each component in the supply chain and the overall business goals (Huin et al. 2002). This is mainly because each component is often an autonomous business unit or profit centre. This situation can result in a lack of integration, coordination, communication and thus cooperation. Thus if goal incongruence (when individuals or groups within an entity may have only partly overlapping goals) amongst components of the supply chain develops, a risk to supply chain integration and thus to value creation for the business ensues (Foss and Christensen 1996; Beamon and Bermudo 2000).

As with other aspects of managing supply chain performance, there has been much work over the last twenty-five to thirty years that addresses the issue of managing the alignment of either internal business units or external business partners to maximise competitive advantage (White 1986; Landeros and Monczka 1989; Laseter 1997; Handfield et al. 1999; Lee and Amaral 2002; Harrison and Godsell 2003; Bryceson and Slaughter 2009, 2010). Such work has shown that goal incongruence and a lack of cohesion can easily develop even in well managed supply chains, but that this can be managed by using appropriately holistic performance metrics and by developing an organisational/corporate knowledge of supply chain issues through internal company educational processes.

For all organisations, the cultivation of organisational knowledge is the essence of developing core competencies necessary to maintain the organisation (Spender 1996). However, organisational knowledge that constitutes a core competency is more than just 'Know What' (explicit knowledge that is easily shared with others for example, in manuals and reports). A core competency (defined by Prahalad and Hamal (1990) as the collective learning skills behind a business's product lines), requires the more elusive 'Know How' or in-head tacit knowledge which is an individual's particular ability to put 'know what' into practice (Brown 1998) and is characterised by reflective thought and action.

In the organisational learning literature the debate as to what is knowledge and how it is related to individual learning is ongoing (Spender 2008). Starbuck et al. (2001) define organisational learning as being the internal adaptation processes that take place when the organisation is challenged by externalities. Organisational knowledge is then what is created as a result of these internal processes (Tsoukas and Mylonopoulos 2004) and where and how such organisational knowledge is located in the organisation (Spender 1993). However, the difference between an individual within an organisation gaining core competencies to address organisational needs by learning new 'knowledge', and organisational learning and organisational knowledge that can be used to address tension between property and senior managers, is a key issue from an organisational training perspective and is the issue which is addressed in the study outlined in this paper.

Computer-based learning environments

Computer gaming is a hugely influential popular culture. Many games aim just for sheer entertainment while others may also be educational, intellectually challenging or emotionally engaging (Salen and Zimmerman 2003). In this study the aim was to develop a computer-based business simulation that could provide a learning tool for property managers and which could be played as a competitive game.

The debate on whether a simulation constitutes a computer game, has changed over time. Crawford (1982) identified a simulation as a model of complex processes making a serious attempt to accurately represent a real phenomenon, through an artificially constructed and competitive process and thus does not constitute a game. Ruohomaki (1995) combined the terms and defined a simulation game as one which "combines the features of a game (competition, cooperation, rules, participants, roles) with those of a simulation (incorporation of critical features of reality). A game is a simulation game if its rules refer to an empirical model of reality" (Ruohomaki 1995, p.14).

Later, Maier and Größler (2000) proposed two typologies of simulations: modelling oriented simulation tools (i.e. those used to model particular issues), and gaming oriented simulation tools. Lean et al. (2006) went further and identified three specific types of simulation-based learning: role play (where participants act out the role of a character in a particular situation following a set of rules); gaming (which involves interaction within a predetermined context, often involving forms of competition, cooperation, conflict or collusion and constrained by set rules and procedures); and computer simulation (which replicates whole of system characteristics using mathematics or simple representations of objects).

In reality, Wilson et al. (2009) in their review agree that games can and do contain elements of simulations and simulations can and do contain elements of games - and thus how a simulation or game might be defined should be related to what it sets out to do and how it achieves this outcome. Anderson and Lawton (2009) similarly accept such "mixed" definitions but then go on to be careful to restrict their investigation into how effective business simulations are for learning to "computer-based simulations in which students or groups of students compete to achieve success in a modelled market environment"

In this paper the purpose of the tool developed was to simulate an abstract model of the internal supply chain system of a business with the view to creating a novel but non-threatening learning environment through game-based competition between groups of managers. As such, the term business simulation game adequately describes what was created in this study and the remainder of this literature review reflects this terminology.

Validity of simulations and computer games as learning tools

There has been some debate as to whether simulations and/or computer games have real value as educational tools. Malone (1981) identified three main ways in which games were able to motivate players towards learning: through fantasy, challenge and curiosity. Later, Cordova and Lepper (1996) showed that learning activities presented in a meaningful and interesting setting such as a computer game could have substantial benefits to learning – a finding supported by Betz (1996) in his analysis of the simulation game SIM City where he highlighted the learning benefits gained in playing the game as whole of systems thinking/learning and problem solving skills development. Prensky (2001) argued that digital game-based learning works primarily for three reasons:

1. The added engagement that comes from putting the learning into a game context. This can be considerable, especially for material people are not willing to learn.
2. The interactive learning process employed.
3. The way the two are put together in a highly contextual package.

McFarlane et al. (2002) and Kirriemuir and McFarlane (2004) found that games play can support valuable skill development such as: strategic thinking, planning, communication, application of numbers, negotiating skills, group decision-making and data-handling - all of which is supported by Pivec and Dziabenko (2004), Vogel et al. (2006) and Lynch and Tunstall (2008) who have demonstrated that computer game-based learning, if developed appropriately, can encourage learners to combine knowledge from different areas in order to choose a solution or to make a decision at a certain point – and to test how the outcome of the game changes based on their decisions and actions. Additionally Pivec and Dziabenko (2004) found that if learners can be encouraged to contact other players to discuss and negotiate subsequent steps, their social skills were found to improve.

Despite the positive literature around the use of simulations and games as learning tools, there are a number of authors who have raised issues and remain concerned in relation to exactly what can be/is learned from such tools. For example, Burns et al. (1990), Gosen and Washbush (2002) and Anderson and Lawton (1992, 1997, 2002) show that performance in doing a simulation and learning from it is not linked or at best is only weakly aligned. More importantly, Anderson and Lawton (2004) show that evaluating learning outcomes from such tools is extremely difficult as it depends on how the researcher has set up both the simulation of, and the evaluation of learning.

However, Vygotsky (1978), Wells (1999) and Bryceson (2009) have found that if grounded in learning theory and developed from the point of view of the learner rather than the technology per se, a computer-based learning environment – whether a simulation or a game - is an excellent scaffolding mechanism for enabling deep learning to occur and for transferring 'Know What' skills into 'Know How' skills. What is also agreed upon by many authors (Dempsey et al. 1997; Seay 1997; Angehrn and Nabeth 1997; Becta Report 2001; Jayakanthan 2002; Annetta et al. 2007), is that the design of the environment should emphasise elements that facilitate the learning process while remaining 'fun' and that 'learning through doing' by playing games and simulations which in general motivate ideas about life, survival, strategy, role-playing and building relationships, offers a powerful knowledge acquisition and learning tool (Crawford 1982).

The development of the computer-based business simulation game used in this study was thus based on this premise and as indicated earlier, was created to enhance new 'Know How' skills associated with the leveraging of company performance information within a large corporate agribusiness in the cattle/beef industry in Australia.

The study

The study was in response to senior managers of ACGC *(the company involved has requested anonymity and is thus referred to as ACGC throughout the remainder of this paper)* identifying some key internal supply chain issues within ACGC relating to overall corporate profitability that had resulted from poor use of company management accounting information by property managers. A training tool and associated training were requested that would enhance organisational learning and thus managegerial performance at the property level.

Approach

A three-stage approach to the project was employed which involved:

1. *A case study analysis* (Yin 2002) of ACGC company financial data as found in the monthly company report to provide an understanding of the current KPIs applied to property managers and the disconnect between the internal business unit (operational) goals and overall corporate (strategic) goals that senior management thought they had identified.
2. *A participative action research stage* (Whyte 1989) which included the development of a business simulation model and game development using actual company financial and production data. The implementation phase within the company involved nine property managers playing of the game in three teams of three people each. This enabled an interactive data gathering on the quantification of financial impacts across the company associated with the relationship between the information property managers were provided with, and:

   (i) Their operational activities relating to specific production issues for each type of property.
   (ii) What prompted the decisions associated with those activities;
   (iii) How such decisions related to operational or corporate management goals.

3. *An analysis of the observations and related issues (debriefing)* that emerged as a result of playing the business game and from discussions on the reasons for making the decisions that were made during the game.

Company Background and Management

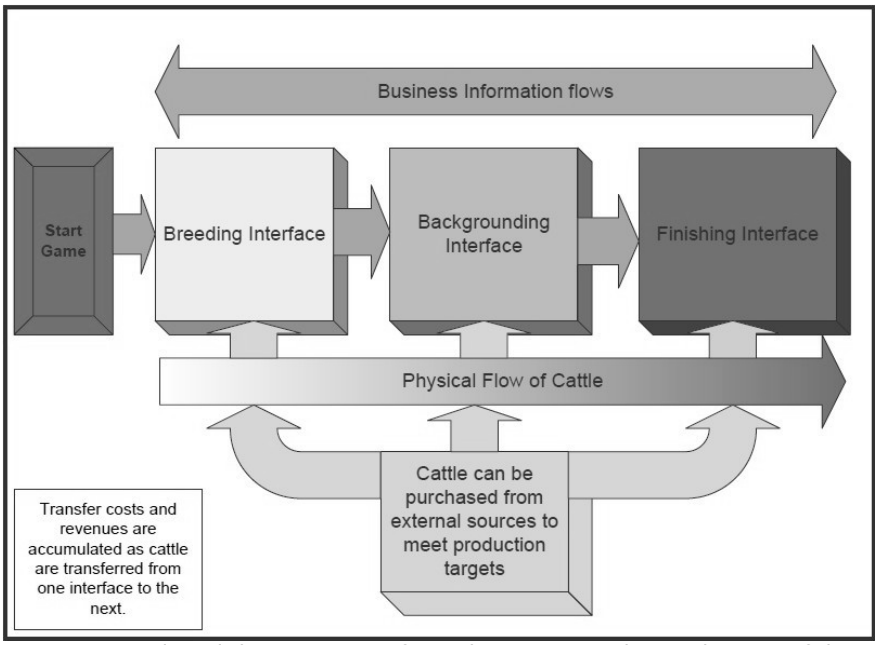
ACGC is a multi-enterprise agribusiness. That is, the company comprises a number of different operational business units that are either supplied by, or supply, another component within the company to form an internal supply chain. Each operational business unit is an independent property run by a property manager and associated staff. Each property has its own individual operational budget and is regarded as a profit centre - although all properties are expected to contribute to the overall profitability of the company as their first priority.

Internal Supply Chain

ACGC has a number of properties across northern and eastern Australia which span the operational cattle production areas of breeding, backgrounding and finishing. The internal supply chain of ACGC (Figure 1) therefore consists of:

- Breeding Properties
- Backgrounding Properties
- Finishing Properties

Figure 1. Schematic of the ACGC internal supply chain simulation



(N.B.Transfer prices received, and the ensuing profits or losses incurred at each stage of the internal supply chain, provide an internal measure of revenues and expenses that replicate what would happen if cattle were bought and sold on the open market).

The internal supply chain includes the physical flow of goods and the associated management accounting information flows that are required for raw materials to be transformed into finished products within the overall company (Fisher 1994; van Helden et al. 2001; Christie et al. 2003; Kaplan and Norton 2004; Simons 2005). A major component of the accounting information flow in ACGC is that associated with transfer pricing between operational units which is used within the organisation as a proxy for market prices of cattle when transferring product (cattle) from one part of the internal supply chain to the next.

ACGC corporate management identified that property managers did not have a clear understanding of the overall corporate goals and how production synergies across the internal supply chain are important in achieving these. Inappropriate or inadequate training was identified as the major problem area and although initiatives in ACGC to broaden the financial management skills and to create a focus on internal supply chain issues had been undertaken, these were regarded as having had limited success. It was decided that a training exercise that clearly demonstrated the financial implications of property managers' management decisions on the internal supply chain was required. A computer game using actual company data was requested by ACGC. The aim of this game was to simulate an interactive business exercise

which could be used with trainer support during a one week company retreat where all Property Managers would be in the same place at the same time, as well as thereafter in the company.

Design of ACGC's Business Simulation Game

The aim of the simulation was to demonstrate the financial flow-on effects from one property to another as a result of individual management decisions (e.g. *What is the production management impact and/or the financial impact of a decision made by a Breeder on a Backgrounder?),* and thus how decisions made across the internal chain affect the financial performance of the whole company. The simulation was underpinned by actual company data and potential outcomes validated to ensure realistic outcomes from business decisions. The design of the game was therefore driven by how an internal supply chain underpinned by corporate accounting information from ACGC would be portrayed so that each player could understand the context in order to gain meaning (Salen and Zimmerman 2003). Crawford (1982), Bateman and Bloom (2005) and Adams and Rollings (2006) discuss four key aspects of a game which should be thought about prior to developing a game.

(1) The Game System which represents the system of rules that create the game framework and govern how it is played. The underlying context of the simulation game discussed here was the internal supply chain and flow of product (number of cattle, weight of cattle (kg), value ($)) from the Breeding enterprise through the Backgrounding enterprise through to the Finishing enterprise, linked to the decisions being made about that product flow in line with corporate business information.

The game system was a formal, experiential and closed system built in MS Excel using built-in functions and programmable macros which were used to control the flow of player input, and the internal calculation and presentation of output to the players. MS Excel was chosen because it is a powerful general purpose program available on most business's computers enabling the game to be used and/or edited and upgraded by the company beyond the life of the project. The aim of the game was two-fold:

- Manage production for the whole herd (given specific criteria)
- Manage costs and returns for the whole herd (given specific scenarios).

Players were scored on their management of costs and their business acumen (i.e. their use of information provided, their decision making and the returns they got as a result of their decisions).

(2) The Game Mechanics which represents the internal algorithms that address how the model underpinning the game actually runs and the sequence of play associated with decision making activities of the players within a situation or scenario.

Two scenarios were created for the game to be played under: a 'Normal' climatic situation (i.e. normal production, choice of transferring at different weights to obtain different value outcomes) and a 'Drought' situation (same as in the Normal case but including a supplementary feeding on grain option with associated financial implications). These scenarios were run one at a time because property managers of properties in Australia who made different decisions about the same issues under these two scenarios, which in reality tend to be an "either" "or" situation; because a high degree of control of the situation in which the players made decisions was required.

(3) The Game Input/Output which represents what the user sees on the screen (output) and what commands the user can give to the program to obtain a desired result (input). Player interaction or input/output in the game was via a series of MS Excel worksheets that were accessed through a Title Page with a company graphic, an Instruction page which gave the overarching goals of the game and how it was to be played either under normal or drought conditions.

A 'Setting-the-Scene' box on each enterprise's input page presented the details of the property being managed. Additionally, a series of input parameters, each with an associated drop down menu containing multiple potential answers was included in each enterprise sheet which were designed to allow players to rapidly explore many options easily and to provide an insight into managers' decision making. Additional information was provided through comments attached to the appropriate input parameter.

Once the input parameters are populated, clicking on 'Breeder Results' gives the results associated with the answers chosen through the Breeder Enterprise Results page. The backgrounder and finishing enterprises have the same input and results pages with variations in

the input variables for relevant parameters such as cattle weight and feed supplementation costs. The process is followed for both the backgrounder and finisher phases respectively

(4) The Game Play which refers to the way in which game actions result in game outcomes. In particular, Salen and Zimmermann (2003, pp. 34-35) refer to generating 'meaningful play' in a game which they believe is the goal of successful game design and which emerges from the relationship between player action and system outcome: the player takes an action and the system responds.

The game played in the developed game allowed the person/s running the simulation game to make decisions at each stage of the internal supply chain (Breeder, Backgrounder, Finisher) - relating to the specific production issues for each type of property. The decisions made by each player were logged and the effects of those decisions, both on the property type being 'managed' in the simulation, and on the other properties (internal supply chain components), were traced and evaluated using some simple criteria e.g. weight (kg/head), numbers of animals, market price ($/kg) costs ($/kg) and time (days) to produce final weight. Each manager was also asked to keep a log of what information they used to make decisions and the reasons why decisions were made from their perspective. Algorithms kept track of cattle weight and cash flow calculations continuously.

In practice, the exercise was undertaken for one hour a day for five consecutive days by ACGC property managers playing in teams of three people. Each team included a manager from each type of property in the internal supply chain - Breeding, Backgrounding and Finishing. As indicated earlier the aim of the exercise was to manage production for the whole company herd (given specific criteria), and manage costs and returns for the whole herd in two different climatic scenarios: normal climatic conditions and in drought.

Semi-structured discussions were conducted with property managers during the playing of the game to gain insights into the relevance of their current practices related to the use of production and financial information at each stage of the internal supply chain. Semi-structured discussions were also conducted with corporate management to ascertain their perceptions of the degree of shared goals and visions between both levels of management. Such facilitated discussions were primarily undertaken to promote a degree of formalised reflectiveness which Ollila (2000) and Raelin (2001) indicate is a key component of learning.

Results, game observations and outcomes

The case study analysis

The case study analysis of ACGC company financial data as found in the monthly company report is reported in Bryceson and Slaughter (2010), however it showed that overall company performance as normally assessed by shareholders used metrics covering a number of areas including profitability, liquidity, financial stability, cash flow and cash sufficiency – i.e. corporate management is judged on how well they have pulled these issues together to maximise the market value of owners' equity. While these metrics are the focus of shareholders and corporate managers, property managers are detached from them because internal management accounting measures such as transfer pricing are used to monitor individual property performance. As a result, the different performance measures used for corporate and operational management resulted in an incongruence of goals between the two different components of the company (ACGC senior managers and property managers 2009, pers. comm. and Bryceson & Slaughter 2010).

While the property managers are highly skilled in operational aspects of running cattle grazing enterprises, they rarely have the knowledge or skills in classic business technologies such as commerce and accounting that their equivalent urban-based divisional managers have (Australian Bureau of Statistics 2006) Therefore, they are often not as proficient in analysing and utilising corporate management accounting information to support their decision making activities. This lack of knowledge and understanding of key financial performance indicators had been identified by senior management as an area where skills need to be upgraded in order to improve overall corporate performance.

Game Observations

The business simulation game conducted was designed using criteria and management decisions that property managers make every day using familiar accounting details, thus creating real and recognisable issues for players to address and ensuring that the point that Peters et al. (1998) make regarding the importance of ensuring that the validity of the model or how near to reality the model underpinning the simulation is, has a major impact on the

motivation of the players. As the property managers played the game iteratively, it became apparent that:

1. A computer simulation game, however strongly based in real life data and detail, when played under mildly competitive conditions in teams forced managers out of their comfort zone and exposed them to unexpected situations in relation to the internal supply chain of the company.
2. All the property managers were very experienced and the exercise indicated that they currently operate well within their comfort zone of management responsibility. However some property managers struggled when challenged with something that was not within their current frame of reference. This is not to say that they did not have the ability to deal with these situations but rather that they were uncomfortable when faced with business-based challenges because they are not in their normal sphere of operation. Wenger (2000, p. 233) argues that learning at boundaries like this is likely to be more effective because experience and competence are in close, generative tension.
3. The criteria that the property managers typically measure themselves by are the transfer prices and the actual sale prices received for cattle on individual properties. They are certainly aware of costs but it appears that they underutilise the Key Performance Indicators of kilograms (kg) produced and the cost of each kilogram produced. This may be related to the information they are normally provided with, however, it is important from a company perspective that they are made to reflect on and report variances in, the kg produced and costs of production per kg.
4. In normal circumstances, the internal supply chain of the company was not something uppermost in a manager's mind when making decisions on the property they managed.
5. After playing the game all week the idea of working collaboratively across the three different types of enterprises to maximise overall corporate outcomes appeared to take hold. This was demonstrated by the changing results over the week with strategic individual property level trade-offs being made to improve overall corporate outcomes. Tables 1a and 1b show examples of the final summary output from the business simulation game played under normal conditions. Table 1a shows overall company profitability when each component works independently to maximise the profit of their individual property/enterprise (a non-integrated approach known as Non Integrated Autonomy); and Table 1b when each component works towards maximising overall corporate profitability (an integrated approach known as Integrated Autonomy) (Bryceson and Slaughter, 2009; Bryceson and Slaughter 2010.

Table 1a. Final summary output from the business exercise run under normal climatic conditions for a Non-Integrated Autonomy Scenario - Return on Total assets = 3.41%

Breeding		Backgrounding		Finishing		Enterprise	
Head produced	***10500***	***Head produced***	***10,625***	***Head produced***	***10,625***	***Head produced***	***10,625***
Transfer Income	$ 4,605,300	Transfer income	$ 8,042,400	Sale Income	$ 13,233,150	**Sale Income**	**$ 13,233,150**
Costs of Production	$ 1,396,500	Costs of Production	$ 6,685,800	Costs of Production	$ 9,763,650	**Costs of Production**	**$ 9,763,650**
Profit	$ 3,208,800	Profit	$ 1,356,600	Profit	$ 3,469,500	**Profit**	**$ 3,469,500**
Income per head	$ 439	Income per head	$ 757	Income per head	$ 1,245.47		
Cost per head	$ 133	Cost per head	$ 469	Cost per head	$ 918.93	**Total Assets**	**$ 101,623,750**
Profit per head	$ 306	Profit per head	$ 288	Profit per head	$ 326.54	**Return on Total Assets**	**3.41%**
Total Asset Value	**$ 39,783,750**	**Total Asset Value**	**$ 29,940,000**	**Total Asset Value**	**$ 31,900,000**		
Days on Property	380	Days on Property	360	Days on Property	120		
Age/days at transfer out	380	Age/days at transfer out	740	Age/days at Sale	860	**Revenue per KG**	**$ 2.10**
Weight at Transfer out	258	Weight at Transfer out	473	Weight at Sale	593	**Overall cost per kg**	**$ 1.55**
Supp Rates/day	5	Supp Rates/day	5	Supp Rates/day	40	**Profit per kg**	**$ 0.55**

Table 1b. Final summary output from the business exercise run under normal climatic conditions for an Integrated Autonomy scenario - Return on Total Assets = 5.99%

Breeding		Backgrounding		Finishing		Enterprise	
Head produced	***14875***	***Head produced***	***15,000***	***Head produced***	***15,000***	***Head produced***	***15,000***
Transfer Income	$ 6,777,050	Transfer income	$ 10,610,600	Sale Income	$ 18,435,900	**Sale Income**	**$ 18,435,900**
Costs of Production	$ 2,290,750	Costs of Production	$ 9,997,550	Costs of Production	$ 12,350,600	**Costs of Production**	**$ 12,350,600**
Profit	$ 4,486,300	Profit	$ 613,050	Profit	$ 6,085,300	**Profit**	**$ 6,085,300**
Income per head	$ 456	Income per head	$ 707	Income per head	$ 1,229.06		
Cost per head	$ 154	Cost per head	$ 486	Cost per head	$ 823.37	**Total Assets**	**$ 101,623,750**
Profit per head	$ 302	Profit per head	$ 222	Profit per head	$ 405.69	**Return on Total Assets**	**5.99%**
Total Asset Value	**$ 39,783,750**	**Total Asset Value**	**$ 29,940,000**	**Total Asset Value**	**$ 31,900,000**		
Days on Property	280	Days on Property	280	Days on Property	80		
Age/days at transfer out	280	Age/days at transfer out	560	Age/days at Sale	640	**Revenue per KG**	**$ 2.10**
Weight at Transfer out	268	Weight at Transfer out	505	Weight at Sale	585	**Overall cost per kg**	**$ 1.41**
Supp Rates/day	25	Supp Rates/day	25	Supp Rates/day	25	**Profit per kg**	**$ 0.69**

6. It is clear that the property management teams are very skilled in managing the operational aspects of their individual properties. However, it was also clear that the managers have difficulty in articulating the sources of information they use to make decisions - and the importance of those sources of information. It became apparent very quickly that there was a very strong reliance on the senior managers such as the General Manager (Production) and the Chief Financial Officer as sources of information and decision making guidance. The property managers seemed to be resigned that they will not make the final decisions regarding the product produced and as such, they believe that their job is to follow instructions from above. While the higher level management decisions will ultimately be made by senior management there appears to be a perception by property managers that their ideas and insights into some of these decisions will not be valued and are therefore not offered.

Discussion of learning outcomes and conclusions

In the Introduction the issue of whether using a business simulation game both as a learning environment for enabling individual knowledge acquisition and for enabling that new knowledge to translate into practical value adding mechanisms for the overall corporate entity, was discussed.

A key part of achieving good performance across the internal supply chain requires an inbuilt reflectiveness of actions taken and the impacts of those actions (Bryceson and Slaughter 2010). An underlying part of this business simulation game was iterative reflective thought and action combined with facilitated reflective discussions. Gray (2007) makes it clear that a combination of reflective tools such as those employed in this study provide a process that mediates between experience and knowledge to provide deep individual learning that can be translated to organizational value adding by the individuals involved following up such thought processes with practice or action. In practice, the only evaluation possible of whether an individual "learned" through playing the business simulation game was to track the results of the teams playing the simulation game on a daily basis, observe how individual property managers played the game and discuss with them why certain decisions were made.

Despite the limitations in evaluating individual learning in this way, given the changing game results over the week, the results suggest that the property managers learnt both about the need to collaborate across the internal supply chain to improve company performance and that physically playing the game created a learning environment that facilitated a better understanding of their role in the supply chain.

To this end, in addition to the standard metrics involved and used in the simulation, property managers were required to report on variances against budgeted measures as well as their understanding of the underlying factors affecting their performance outcomes (e.g. seasonal conditions). Such reporting required managers to reflect on the impacts that their management decisions have on their own production issues but also on the wider impacts of these decisions and associated variances on the efficiency of the internal supply chain and subsequently the effects on overall corporate performance in relation to such factors.

The approach encouraged property managers to focus on factors that influence the designated corporate KPIs and associated metrics, (in the context of seasonal and market conditions), thus aligning production goals with corporate goals. This then resulted in the performance of each stage of the internal supply chain being measured in relation to its contribution to overall corporate performance. As such 'balance' is created between measures of production performance within the internal supply chain and corporate performance.

Without the business simulation game and its repetitive playing, the knowledge acquisition and learning noted above would not have taken place. The business simulation game in this situation fulfilled the goals set for it and at the same time provided some interesting insights into the long term strategy development opportunities for the company for both property managers and senior managers alike.

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