Well played? Examining strategy and performance in off-field sporting operations

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Abstract
Professional sport is in many ways a type of business. From an operations management perspective it is worthy of note that professional sport exhibits several specific features that require a customised set of practices to ensure effective operations (Smith and Stewart, 2010). In this paper we focus on developing four key constructs that exemplify the special characteristics of the sport industry: i) limited control of the sports product, ii) uncertainty of on-field outcome, iii) spectator co-creation and iv) enforced collaboration. We outline the development of a survey on stadium operations and share the next steps in the research.

Keywords: Strategy, sport industry, survey research

Purpose of the study
The relationship between operations strategy, operations management and improved business performance has been the subject of empirical investigation in manufacturing firms since the 1960s (Skinner, 1969). Studies have shown how competitiveness and profitability are the key drivers for the adoption of operations management tools and techniques (Rho *et al.*, 2001) and how the alignment of manufacturing strategy and business strategy positively influences the improvement of business performance (Sun and Hong, 2002). In translating these findings to a service setting, it is commonly agreed that consistency between an organisation's competitive priorities and decisions regarding operations is important (Prajago and McDermott, 2008). The key difference with services is the complex strategic issue of the influence of the customer on the service production and delivery process (Kellogg and Nie, 1995).

Drawing on this body of literature is helpful in examining the topical subject of off-field sports operations management. Sport is ubiquitous across the world and professional and amateur events require the co-ordination and management of resources. It is therefore interesting to note that management of off-field sports operations has received limited research attention from operations scholars (Kauppi *et al.*, 2013b; Machuca *et al.*, 2007). The well documented competitive priorities of

quality, cost, dependability and flexibility (Wheelwright, 1984) would seem to apply here; however the complexity of their achievement is amplified due to particular industry characteristics (Smith and Stewart, 2010), for example:

i) Limited control over the sports product - operating rules and regulations are often imposed by external parties.
ii) Uncertainty of on-field outcome – can affect the perceived quality of the sporting experience.
iii) Spectator co-creation – fans are both producers and consumers of the sporting experience.
iv) Enforced collaboration – sporting rivals must collaborate to organise competitive events.

These industry specific characteristics provide an interesting backdrop against which to pose the following research question:

What is the relationship between operations strategy, the characteristics of the operating environment and performance in off-field sports service operations?

In this paper we present our empirical findings to date that address the research question posed. We firstly discuss relevant literature on the distinct characteristics of the sport industry and develop hypotheses. We then outline the methodology of our on-going data collection efforts through an international survey and present some preliminary descriptive results and construct testing. Finally we outline our future research plans and potential contributions.

Literature review: Operations Management Implications of the Distinct Characteristics of the Sport Industry

The sport industry is part of the service industry and shares many of the characteristics typical of services (i.e. perishability, intangibility, inseparability and heterogeneity) (Bitran and Logo, 1993; Karmarkar and Pitbladdo, 1995; Prajogo, 2006). Such service characteristics have implications for the off-field operations and quality management of sporting events as they are time bound, unable to be stored, delivered in real time and non-standardised. There is an established body of literature that considers service industry operations management; some of which has been applied to the sport industry (Chang and Chelladurai, 2003; de Knop *et al.*, 2004; Heim and Ketzenberg, 2011).

In addition to the operations challenges associated with services, the sport industry also exhibits distinct characteristics that have implications for off-field operations and quality management that are now discussed. In the following, we present preliminary hypotheses regarding the relationship between sport industry special characteristics and stadium operations management practices.

Limited control over the sports product

Sport is subject to local, national and international rules and regulations that are not present in other industries. Examples include the fact that product specifications, such as competition duration and format, are outside of the control of the individual sporting organisation. This limits ability of the sporting organisation to make decisions about the sports product and can restrict opportunities for differentiation.

Sports leagues have been described as occupying a position of monopoly power and are seen as behaving like a firm (Neale, 1964). Leagues are characterised by a fixed number of members; the league determining the games that are played and restricting

entry. This restrictive setting may stifle the desire for continuous improvement in the pursuit of off-field sports operations management as there is a perception that there is little incentive or opportunity to change the status quo. We therefore hypothesise that:
H1: The more limited the control an organisation has over the sports product the less it will apply operations and quality management approaches to off-field sports operations.

Uncertainty of on-field outcome
A distinguishing feature of sport is the unpredictability of outcome associated with a contest (Neale, 1964; Trenberth, 2012). As on-field performance is variable (Stewart and Smith, 1999), sport managers are perceived to be in the business of managing uncertainty (Chadwick, 2009). Uncertainty is seen as a troublesome yet unavoidable feature of professional sport (Stewart and Smith, 1999); the implications of which can have severe consequences for the management of off-field operations. For example, a negative on-field outcome can impact the perceived quality of the off-field sport operations (e.g. length of queues, customer service) and uncertainty of outcome creates challenges for league and cup competitions as future game locations are known only at short notice (Kauppi *et al.*, 2013b).
H2a: The more uncertainty related to the on-field outcome, the more an organisation will put emphasis on quality as a strategic operations objective.
H2b: The more uncertainty related to the on-field outcome, the more an organisation will apply quality management techniques in their off-field operations.

Spectator co-creation
Experience and perception are seen as essential to value determination (Vargo and Lusch, 2006) and one of the primary reasons that spectators attend sporting events is to be part of the atmosphere; which means that fans are co-creators of the sporting experience (Basole and Rouse, 2008; Vargo *et al.*, 2008). Co-creation creates complexity for sport operations managers as fans not only purchase and consume the product, they also help to create the atmosphere which gives strength to the product. Fans are co-creators of the sporting experience but often have to pay for the experience and therefore have expectations in terms of both on-field and off-field performance. With respect to service quality, the concept of fans paying to attend *and* being part of the co-production of the event is extremely important to recognise. To maintain a high level of service quality the sport organisation must identify how to maintain interest, enjoyment and attendance at the events, even when games are not markedly exciting (Clemes *et al.*, 2011). Spectator co-creation also creates an element of uncertainty and uncontrollability to the stadium operations that needs to be controlled for; both to ensure smooth operations and a good customer experience. We therefore expect to see a greater uptake and application of quality management tools and techniques in spectator sporting events, and thus hypothesise that:
H3: Higher levels of spectator co-creation increase the use of quality management techniques in off-field sport operations.

Enforced collaboration
Sporting contests require the co-operation of a least a second player or team to produce the event, and for tournaments several players or teams must co-operate (Neale, 1964). Therefore the success of any sporting contest is contingent on the premise that individuals/teams/groups will need to co-ordinate their activities (Chadwick, 2009). Unlike in many other industry settings, sports clubs must co-operate with their rivals to

meet the expectations of their stakeholders (Stewart and Smith, 1999). This creates a conundrum for the sport industry in that competition and co-operation are required in parallel; competition to create the sporting interest and co-operation to enable the event to take place (Smith and Stewart, 2010). Researchers have paid limited attention to the phenomenon of enforced collaboration in the sporting context and it is has been argued that the way in which competitors collaborate in the scheduling of contests requires further attention from scholars (Chadwick, 2009). Enforced collaboration requires a high degree of planning and scheduling, which in turn suggests the use of established operations management tools and techniques. We therefore posit that:
H4: The more enforced collaboration an organisation encounters, the higher the use of operations management tools and techniques.

Research Methodology
Our data collection process is still on-going at the time of the paper submission to the conference. In this paper we will therefore present our on-going data collection methodology and preliminary descriptive analysis of the data that we have collected thus far.

Data collection method
Our data collection method is designed along the lines of the International Manufacturing Strategy Survey (see e.g. Voss and Blackmon, 1998; Gimenez et al. 2012) and the International Purchasing Strategy Survey (see e.g. Kauppi et al. 2013a). The data is being collected through the International Sport Operations Management Survey (ISOMS) project. This survey was developed to identify and study the operations management tools and techniques that are currently used by sport stadiums operations managers in the United Kingdom, United States, Canada, Australia and New Zealand. The target countries were chosen because an English language questionnaire and similar linguistic background reduces possible data equivalence issues in our sample.

Our unit of analysis is sport stadiums and the target respondents are stadium operations managers (or equivalent). Sampling is difficult in this context given that no databases of stadium operations managers exist from which to draw a random sample, as is typical in e.g. SCM research with different membership lists of purchasing and supply professionals. Sport stadiums and other spectator locations do not have their own ISIC code either. We therefore set out to develop a database of sports operations management professionals with the aim of representativeness (proportional amount of contacts in different types of stadiums/sports given the popularity of the sport and in the different countries) using sport club websites. Based on targets in countries and sports leagues, we have been attempting to identify potential stadiums and respondents therein through organisational websites and LinkedIn. Additionally, we are using snowball sampling in that respondents are also asked to recommend colleagues at other stadiums that could be contacted to complete the survey. Respondents are first sent a pre-notification letter to inform them of the survey, followed by an email and/or paper survey. Several reminders are sent to increase the response rate.

Survey design and constructs
The survey contains sections on 1) general information on the venue, 2) the sport and operating environment, 3) business and operations strategy, 4) venue operations management and 5) operations performance. Particular emphasis in section 4 is placed on service quality, queuing and capacity management. In item and construct

development, pre-existing scales from operations strategy and management literature were used as much as possible or were slightly modified to fit the stadium context where appropriate. In survey design, several attempts were made to avoid common method bias: questions on strategies, practices and performance were placed at different sections in the questionnaire (proximal separation), (Podsakoff *et al.*, 2003) and the sequence of items was randomized for the online version (Chang *et al.*, 2010).

While the special characteristics of the sport operating environment have been discussed conceptually in past literature, they have not been used in empirical studies. Therefore, the items and constructs to measure them were developed via the q-sorting procedure. Following Moore and Benbasat (1991), the instrument development contained three steps: 1) item creation, conducted to produce pools of items for each construct through item identification from literature, and by creating additional items matching the construct definitions, 2) scale development**,** where panels of judges (professionals and academics in the field) sorted these items into separate categories in several rounds. The sorting was done based on the similarities and differences among the items. After each round, items were eliminated or reworded to come up with the final set of items. 3) Instrument testing. This can only be completed after all responses are collected.

The four constructs developed via this method are: *uncertainty of outcome, spectator co-creation, limited control over the "product"* and *enforced collaboration.* In the survey they were measured on a 7-point Likert scale with five, seven, eight and seven items respectively. The items are available in Table 3. Operations strategy was measured by asking the respondents to indicate the degree of strategic emphasis on several objectives in their venue operations (scale from 1 to 7, with 1 = a very low emphasis and 7 = very high emphasis). The items were modified from/inspired by Prajago and McDermott (2008), Ward *et al.* (1998) and Wong *et al.* (2011) to suit the sport industry context. Specifically for quality as a strategic objective, the three items were "*Having repeat visits from customers*", "*Providing a high level of service to customers at events*" and "*Reducing customer complaints*". Quality management was measured by eight items from Zhang *et al.* (2012). Respondents were asked to indicate on a 7-point agree/disagree scale the use of several quality management techniques for quality exploration and exploitation.

Descriptive statistics

At the time of the conference paper submission we have 53 responses. In table 1, the distribution of responses based on stadium spectator capacity, sport played at venue and venue type is shown. Table 2 shows the characteristics of the respondents (the stadium operations managers). From Table 2 it can be seen that almost half of the operations managers at sport stadiums have had no formal operations management training at all, with only 23% holding a degree or formal certificate in the area. This reinforces our research motivation in terms of the need to study and further develop the application of operations management practices in sport stadiums.

Table 1 Stadium descriptive characteristics (n=53)

Spectator capacity	Frequency	Percentage	Sport at venue	Frequency	Percentage
below 1 000	8	15 %	American Football	1	2 %
1 000-9 999	15	28 %	Basketball	1	2 %
10000 - 50 000	24	45 %	Cricket	7	13 %
over 50 000	5	9 %	Horse racing	6	11 %
Venue type	**Frequency**	**Percentage**	Rugby	10	19 %
Indoor	6	11 %	Football/soccer	8	15 %
Outdoor	39	74 %	Tennis	4	8 %
Both	8	15 %	Multiple sport venue	16	30 %

Table 2 Stadium operations management background statistics (n=53)

Amount of operations management training taken	Frequency	Percentage	Respondent background	Frequency	Percentage
Not at all	24	45 %	Professional athletic		
1 module	5	9 %	background	7	13 %
Several modules	12	23 %	Amateur athletic		
Professional certificate	7	13 %	background	30	57 %
Undergraduate degree	2	4 %	No athletic		
Postgraduate degree	3	6 %	background	16	30 %

Construct validation

Given the incomplete data collection, detailed analysis on the relationships between variables cannot yet be provided. More data cleaning will also be needed once the full response set is available. Here we will thus present preliminary results regarding the construct characteristics with a focus on the newly developed sport operating environment characteristics. The goal is to later test the models in more detail with exploratory and confirmatory factor analysis and regression analysis as well as structural equation modelling, once response numbers reach a sufficient level for more advanced models.

The descriptive statistics (mean, standard deviation and range) for each of the sport industry special characteristics constructs are shown in Table 3.

Table 3 Descriptive statistics on sport industry special characteristic items

Construct	Item		Range	Mean	Std. Dev.
Enforced collaboration	EC1	We must collaborate with our sporting rivals to offer sporting events for spectators	6,0	5,038	1,9510
	EC2	We need to devise schedules jointly with our sporting rivals	6,0	5,245	1,6630
	EC3	We have to co-ordinate with broadcasting and media when organising our operations	6,0	5,098	2,0905
	EC4	Without cooperating with our sporting rivals, we would not exist	6,0	3,925	2,2088
	EC5	We need to collaborate with our sporting rivals to optimise the security and the logistics at and around the venues	6,0	4,623	1,9338
	EC6	We need to co-ordinate our event planning with our sporting rivals	6,0	4,868	1,7871
	EC7	We need to decide on admission pricing together with our sporting rivals	6,0	3,385	1,9917
Limited control	LC1	The timing of fixtures can change often	6,0	3,423	1,7970
	LC2	The timing of fixtures can change at relatively short notice	6,0	3,308	2,0053
	LC3	We have limited control over the regularity of fixtures at our venue	6,0	3,519	2,0243
	LC4	We have limited control over the time of the day sporting events take place	6,0	3,642	2,1670
	LC5	We cannot fully control the day of the week the events take place	6,0	4,096	2,0123
	LC6	We have limited control over the convenience of the location of fixtures for venue operation purposes	6,0	3,731	2,0591
	LC7	Decisions on game/event formats are not in our hands	6,0	3,868	2,0943
	LC8	We must adhere to game/event formats decided by external bodies	6,0	5,245	1,9894
Spectator co-creation	SC1	Spectators impact each other's experience at the games/events	6,0	6,170	1,2206
	SC2	Spectators are important in creating the atmosphere at the games/events	3,0	6,642	,6532
	SC3	Spectator behavior can complicate event operations	6,0	5,830	1,5657
	SC4	Spectators are an important resource in adding enjoyment value to the game experience	4,0	6,283	1,0809
	SC5	We need to manage spectators as partial employees	6,0	3,849	1,8953
	SC6	The event suffers if we do not have many spectators	6,0	5,830	1,5901
	SC7	Spectators are important in helping the home team/athlete(s) perform well on-field	6,0	5,566	1,6468
Uncertain outcome	UO1	Winning does not always mean the same as providing a high quality game to spectators	6,0	5,377	1,6199
	UO2	The performance of home team / athletes during an event is highly variable	5,0	5,302	1,3095
	UO3	The outcome of the event in terms of spectator satisfaction is unpredictable	6,0	4,808	2,0102
	UO4	The outcome of the event in terms of final score is unpredictable	6,0	5,830	1,3263
	UO5	The quality of the game /sport performance that we can offer to spectators varies	6,0	5,189	1,7765

Construct validity was estimated via Cronbach's alpha (with standardised variables). For established scales, a minimum level of 0.70 is expected (Nunnally, 1978) while for newly established scales in an exploratory study, an alpha value of over 0.6 is deemed sufficient (Kahn and Mentzer, 1994). The results are shown in Table 4. From it we can observe that all the newly developed constructs demonstrate high construct reliability with the data so far, apart from "*uncertain outcome"*. While the quality management items from Zhang *et al.* 2012 in their study were used as several constructs (quality exploitation and exploration with customer focus and process control), in the sport stadium context they appear to load onto a single construct of quality management (also in exploratory factor analysis).

Table 4 Construct reliability statistics

Construct	Cronbach's alpha with all items	Cronbach's alpha with item deletions
Enforced collaboration	0,808	N/A
Limited control	0,721	N/A
Spectator co-creation	0,743	0,796[a]
Uncertain outcome	0,544	0,592[b]
Quality strategy	0,784	N/A
Quality management	0,812	N/A

[a]Items SC3 and SC5 deleted due to improve alpha

[b]Item UO3 deleted to improve alpha

Next steps in the research will include more detailed construct analysis through confirmatory factor analysis, followed by regression analysis to test our hypotheses.

Findings

The work so far has developed new constructs to measure *uncertainty of outcome, spectator co-creation, limited control over the "product"* and *enforced collaboration* in the context of sport stadium operations. Three of the constructs demonstrate high construct reliability with the data that has been collected thus far. Data collection is on-going and further analysis of the findings is expected to extend research on the link between operations strategy and performance in manufacturing settings to service operations, specifically sport stadiums. As Hensley (1999) states, the development of scales is in itself not a contribution to theory development, but the real contribution is that the scales can be used to relate the construct to other constructs or to organisational performance. This is our next intended step in the study. We expect to identify links between operations strategy, practices and performance within the sport services setting and to detect best practices that drive performance improvements within these service contexts.

Relevance/Contribution

As limited work has examined operations strategy in an off-field sporting context, this study makes a timely contribution. The findings of the study can be used to ascertain whether taxonomies of operations strategy that have been proven in manufacturing can be extended to services. The forthcoming hypotheses testing between strategies, practices, industry context characteristics and performance has the potential to identify how operations can make a positive contribution to the performance of off-field sporting operations.

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