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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
crunidrum 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 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)
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>
<thead>
<tr>
<th>Spectator capacity</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Sport at venue</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>below 1 000</td>
<td>8</td>
<td>15 %</td>
<td>American Football</td>
<td>1</td>
<td>2 %</td>
</tr>
<tr>
<td>1 000-9 999</td>
<td>15</td>
<td>28 %</td>
<td>Basketball</td>
<td>1</td>
<td>2 %</td>
</tr>
<tr>
<td>10000 - 50 000</td>
<td>24</td>
<td>45 %</td>
<td>Cricket</td>
<td>7</td>
<td>13 %</td>
</tr>
<tr>
<td>over 50 000</td>
<td>5</td>
<td>9 %</td>
<td>Horse racing</td>
<td>6</td>
<td>11 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Venue type</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Sport at venue</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indoor</td>
<td>6</td>
<td>11 %</td>
<td>Football/soccer</td>
<td>8</td>
<td>15 %</td>
</tr>
<tr>
<td>Outdoor</td>
<td>39</td>
<td>74 %</td>
<td>Tennis</td>
<td>4</td>
<td>8 %</td>
</tr>
<tr>
<td>Both</td>
<td>8</td>
<td>15 %</td>
<td>Multiple sport venue</td>
<td>16</td>
<td>30 %</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Amount of operations management training taken</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Respondent background</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>24</td>
<td>45 %</td>
<td>Professional athletic background</td>
<td>7</td>
<td>13 %</td>
</tr>
<tr>
<td>1 module</td>
<td>5</td>
<td>9 %</td>
<td>Amateur athletic background</td>
<td>30</td>
<td>57 %</td>
</tr>
<tr>
<td>Several modules</td>
<td>12</td>
<td>23 %</td>
<td>No athletic background</td>
<td>16</td>
<td>30 %</td>
</tr>
<tr>
<td>Professional certificate</td>
<td>7</td>
<td>13 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate degree</td>
<td>2</td>
<td>4 %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Postgraduate degree</td>
<td>3</td>
<td>6 %</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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
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 ongoing 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.

References

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach's alpha with all items</th>
<th>Cronbach's alpha with item deletions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enforced collaboration</td>
<td>0.808</td>
<td>N/A</td>
</tr>
<tr>
<td>Limited control</td>
<td>0.721</td>
<td>N/A</td>
</tr>
<tr>
<td>Spectator co-creation</td>
<td>0.743</td>
<td>0.796&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Uncertain outcome</td>
<td>0.544</td>
<td>0.592&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Quality strategy</td>
<td>0.784</td>
<td>N/A</td>
</tr>
<tr>
<td>Quality management</td>
<td>0.812</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<sup>a</sup>Items SC3 and SC5 deleted due to improve alpha

<sup>b</sup>Item UO3 deleted to improve alpha


