

Environmental sustainability scholarship and the efforts of the sport sector: A rapid review of literature

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Abstract

The sport sector has witnessed a shift where organizations at all levels have begun to place considerable importance on becoming more environmentally conscientious. Simultaneously a growing body of scholarship has addressed sustainability in sport as well. The purpose of this study was to evaluate the state of scholarship on environmental sustainability over an 11-year period (2007 - 2017) and to determine whether scholarship in this domain is addressing (or not) the efforts of the sport sector using rapid review methodology. To achieve this objective, 96 peer-reviewed journals were identified and reviewed for manuscripts related to the topic, applying specific criteria. A rapid review was carried out, and a total of 84 articles were obtained. Additionally, the content from the Green Sports Alliance, a sport sustainability information and knowledge clearinghouse organization, was categorized into seven groups: performance/evaluation, marketing/communication, fan engagement/behaviours, procurement, facility management, managerial decision-making, and social sustainability. Results indicated that the areas most addressed by scholars were management, fan behaviour and facilities management, whereas the least emphasized were performance evaluation and social sustainability. Each area is discussed in detail and suggestions for how to bridge the gap between the sport sector efforts and scholarship to advance environmental sustainability in the sport sector is addressed.

Keywords: sustainability, green, environment, sport, rapid review, Green Sports Alliance

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Introduction

Rationale

Perhaps one of the most pressing and time-sensitive threats that we face in our society is climate change (Melillo, Richmond, & Yohe, 2014). The impacts of climate change threaten the lives and livelihood of many people across the world and swift responses are necessary to reduce carbon emissions and prevent catastrophic changes to the world around us (Thomas, et al., 2004). The global community united together to sign the Paris Climate Agreement as part of the 21st Conference of Parties (COP21) in December 2015. The Paris Climate Agreement aims to reduce carbon emissions to combat climate change and prevent global average temperatures from increasing 2° Celsius. Despite the initial commitments from an overwhelming majority of countries, much more must be done to meet these aims. All federal and local governments, business sectors, and individuals ought to take responsibility where they can, to use their influence to reduce environmental impact (i.e., carbon emissions), and the sport sector is no exception (Sartore-Baldwin & McCullough, in press; Sartore-Baldwin, McCullough, Quatman-Yates, 2017).

While the United Nations Framework Convention on Climate Change (UNFCCC) recognizes that the sport sector, as a whole, does not have a large carbon impact, the sector plays a critical role in fulfilling the Paris Climate Agreement's aims to be carbon neutral by 2030 (UNFCCC, 2017). As Belson notes, as large as the sport sector may be, sport organizations consume just a sliver of the nation's energy and produce a fraction of its waste. But they are seen and used by millions of Americans every day, which has helped leagues counter the perception that sports teams are wasteful enterprises and in fact can convey socially responsible messages to spectators of all political and economic stripes. (Belson, 2010, ¶ 8) Mirroring this sentiment, the United Nations recognizes the value of the sport sector as one of the most influential to

encourage the broader population to be more environmentally responsible. As a result, the UNFCCC has two specific goals for the sport sector in achieving the Paris Climate Agreement's aims. First, the UNFCCC wants the majority of the sport sector to commit to the sectors own climate declaration, which will commit the signees to be environmentally responsible organizations. Ideally, individual sport entities (i.e., governing bodies, leagues/federations, teams/clubs, athletes, vendors, sponsors) would 'get their house in order' and implement environmentally responsible practices. This commitment and their subsequent actions will increase their perceived legitimacy as an authority to encourage others (i.e., clubs, spectators) to follow suit (McCullough, Trendafilova, & Picariello, 2016).

Second, the UNFCCC wants the sport sector to use its influential social platform to engage sport spectators to encourage them to act more environmentally responsible. Sport spectators have a tremendous affinity to their respective teams (Fink, Trail, & Anderson, 2002; Sutton, McDonald, Milne, & Chiperman, 1997). This affinity (i.e., fan identification) can be leveraged in such a way that the sport entity can use their fans' identification to promote and influence sustainable behaviours (McCullough, 2013; McCullough & Kellison, 2016). These behavioural changes can be done in a variety of ways including green games (Casper, Pfahl, & McCullough, 2017), sustainability messaging campaigns (Trail, 2016; Trail & McCullough, 2017), and a variety of other initiatives (Mallen & Chard, 2011). However, it is clear that many sport practitioners do not know how to initiate a robust sustainability campaign (McCullough, Pfahl, & Nguyen, 2016; Nguyen, Trendafilova, & Pfahl, 2014). Thus, it is important to rely on reliable and current sources of information including best practices from industry trade organizations (e.g., Green Sports Alliance, BASIS, Sport Environmental Alliance, etc.) and academic research.

These two areas of contribution are necessary for the theoretical and empirical aspects of research to work in conjunction with the trends, progress, and efforts of practitioners (Cunningham, 2013). These two areas inform one another to increase the sophistication and evaluation of the sustainability movement (McCullough et al., 2016). Kates and colleagues (2001) commented that, in areas of climate change or sustainability sciences, the amount of uncertainty and limited information requires that scientific exploration and practical application must occur simultaneously. These two areas tend to be influenced and become entangled, with each other (Bolin, 1996). Considering this and weighing the UNFCCC's goals for the sport sector, it is necessary to evaluate how the sport management academy has responded to the growing momentum in the sport sector to be more environmentally sustainable.

Objectives

The rationale presented above calls for the necessity to conduct a rapid review, not just of the broad research conducted in the sport academy, which has been tremendously valuable (see Mallen, 2017; Mallen, Stevens, & Adams, 2011), but rather to examine how the sport management researchers are responding to the trends, progress, and efforts of industry practitioners. Thus, the research question that guided this rapid review was the following: Has environmental sustainability research addressed the current efforts of the sport sector? The specific objectives were: 1) to identify scholarly work related to environmental sustainability, 2) to determine the primary efforts of practitioners (i.e., areas in which the Green Sports Alliance (GSA) has worked with the sport sector), and 3) to discover whether there are any gaps between what sport management scholars have published and what the sport sector is addressing in relation to environmental sustainability. With that said this rapid review aimed to identify and systematize all relevant scholarly work related to the research question and published or in press

in the period of January 2007 – September 2017. The rapid review included only articles published or in press in the NASSM list of journals and only written in English.

Methods

Considering the purpose of this study, we deemed it most appropriate to employ a rapid review as the method of data collection and analysis (Gannan, Ciliska, & Thomas, 2010; Khangura, Konnyu, Cushman, Grimshaw & Moher, 2012). This specific methodology is typically used by practitioner decision makers and academics who need to quickly assess a current issue in order to support “evidence-informed decision making” by relevant stakeholders (i.e., practitioners, academics). Specifically, given the context of this study and the dire need for immediate action to combat climate change, this approach is most appropriate to examine how industry practices and sport management research focused on environmental sustainability align. Compared to systematic reviews, rapid reviews are typically conducted in a shorter timeframe, research questions are specified *a priori*, sources may be limited but strategies are made explicit, the selection criteria of sources are uniformly applied, and the synthesis of data are descriptive in nature categorizing the data accordingly (Khangura et al., 2012). In the section below, we explain the criteria for the selection of articles, the process of data collection (e.g., information sources), and the steps utilized in the categorization and analysis of data.

Selection criteria

The selection criteria for this rapid review were the following: 1) the articles must be peer-reviewed and published or in press in a scientific journal, 2) the articles must be written in English, 3) the articles must have been published or in press between January of 2007 and September of 2017, and 4) the articles must present a research related to environmental sustainability in the realm of sport from journals listed on the North America Society for Sport

Management's journal list (see <https://www.nassm.org/Journals/JSSM>). Articles had to meet all four points to be included in our analysis. The second point in the eligibility criteria was selected due to the authors' proficiency in English. The third point in the eligibility criteria was selected because we decided to focus on research contemporary to the sport sector activities encompassed by an industry authority, the Green Sports Alliance (GSA), which was established in 2010.

Green Sport Alliance. The Green Sports Alliance was founded in 2010 and their purpose as stated on their website is to provide a forum to exchange information about better practices and develop solutions to their environmental challenges that are cost-competitive and innovative. The information gathered from this collaboration is available to Alliance members in order that they gain a better understanding of how sporting events can be performed in an environmentally sensitive manner. (Green Sports Alliance, 2017)

The GSA hosts monthly webinars on specific sustainability topics related to sport in addition to having an annual conference in North America to inform practitioners on current practices and timely environmental issues. The GSA is the premier clearinghouse on best practices and knowledge surrounding the integration of environmental sustainability into the sport sector. They produce materials discussing these best practices and advocate for a deeper integration of environmental sustainability in the sport sector domestically and abroad. In fact, as part of their advocacy efforts and in conjunction with the U.S. Environmental Protection Agency, the GSA influenced the Obama Administration in 2016 to declare October 6 as Green Sports Day in the US (Green Sports Alliance, 2016).

The research aim of this study is to determine if scholarship published in the sport academia corresponds to the efforts of the sport sector as determined by overarching categories extracted from various GSA materials, webinars, and conferences. We decided to include three additional years to ensure that any work conducted close to the GSA formation and its involvement with the sport sector is included in the rapid review. The fourth point in the eligibility criteria was selected to ensure that only articles related to the topic of environmental sustainability are included in the search. Again, articles that did not fulfil the four points of eligibility were excluded from this study.

Data collection process

The North American Society for Sport Management (NASSM) was founded in 1985. The purpose of the Society is to promote, stimulate, and encourage study, research, scholarly writing, and professional development in the area of sport management (NASSM, 2017). NASSM maintains a comprehensive list of journals in sport management and related domains. This list is updated annually to include new journals and to represent specific areas in which scholars are publishing (e.g., facility management, economics, finance, marketing, law and policy). The most recent NASSM list of journals contains 96 peer-reviewed journals. Prior to beginning the review process, a review team was formed encompassing two experts on the research topic, a formal protocol was designed, detailing the responsibilities of each investigator, and the way in which the data would be compiled in research synthesis. Below we list the protocol steps, describe each step-in detail, and the actions taken at each step.

First, both investigators reviewed the 96 journals by splitting the workload in half, meaning one investigator reviewed 48 journals and the other the remaining 48 journals. The article search was done manually by either accessing the journal official website or through

the library resources of the institutions in which the authors work. Since not all higher education institutions offer full-text acquisition for journals, the investigators utilized the library sources of three different higher education institutions to ensure that full-text was obtained. It was important to have access to full-text since some journals have strict word limits on the abstract content, and selection based only on the title and abstract content could have eliminated articles related to the objective of this study. Only papers meeting the eligibility criteria were selected; those outside the eligibility criteria were excluded. The specific keywords related to the focus of this study and used for the article content search were: *sustainability*, *environment*, and/or *green*. Only papers containing one or all of the three keywords in the text were selected, the rest were excluded. This first step of the search protocol took one month (September 2017).

Second, this step involved reading in full all articles that met the eligibility criteria and had a content related to one of the keywords. This step was completed by one of the investigators. This step also involved data extraction from each article, meaning the objectives and key findings of the articles were briefly summarized. This second step of the search protocol took one month (October 2017).

Third, this step involved examining all materials from the Green Sports Alliance in order to determine the overall categories of the initiatives that the sport sector practitioners have prioritized. The GSA is the first non-profit practitioner-oriented group that has brought together various sport sector related entities (e.g., teams, facilities, vendors, sponsors, NGOs) to focus on environmental sustainability issues in the sport sector.

The Green Sports Alliance was founded in 2010 and their purpose as stated on their website is to provide a forum to “exchange information about better practices and develop

solutions to their environmental challenges that are cost-competitive and innovative. The information gathered from this collaboration is available to Alliance members in order that they gain a better understanding of how sporting events can be performed in an environmentally sensitive manner” (Green Sports Alliance, 2017). The GSA hosts monthly webinars on specific sustainability topics related to sport in addition to having an annual conference in North America to discuss more broad and timely issues. As such, we conducted a rapid review (see Gannan, Ciliska, & Helen, 2010) of the materials from the 74 monthly webinars (2011-2017) and seven annual conference programs (2011-2017) to determine overall categories of the industry’s focus on particular sustainability topics. Specifically, keywords were taken from each description of the various monthly webinars and each session at the annual conference since their inception in 2011. These keywords were then grouped into sub-categories based on the general themes of the session or webinar. These sub-categories were then sorted into overall categories. In total, we determined that there were seven categories: *performance/evaluation*, *marketing/communication*, *fan engagement/behaviours*, *procurement*, *facility management*, *managerial decision - making*, and *social sustainability*. This entire process took three weeks to gather the necessary data, analyse, categorize and member-check the classification and generated categories.

The fourth and last step included evaluating the data extracted from each article and was conducted by one of the investigators. The purpose of this additional evaluation was to apply the second level of selection criteria established in Step 3 of the protocol. This allowed for the further synthesis of the data and for answering the research question of the rapid review. This step of the search protocol took two weeks to complete (November 1-15, 2017).

Summary

This section provides a synthesis of the results and is organized in three different subsections, according to the research objectives: 1) scholarly work related to environmental sustainability, 2) areas in which the GSA works with the sport sector, and 3) gaps (if any) between what sport management scholars have published and what the sport sector is addressing in relation to sustainability. After utilizing the first level selection criteria, the article search produced 84 articles related to sustainability, environment and/or green. After utilizing the second level selection criteria, the rapid review produced 43 articles (see Table 1, Table 2, and Appendix for a full list of all 43 articles).

Scholarship related to environmental sustainability

The rapid review of literature illustrated that the area most addressed by scholars was *management* (16 articles), followed by *spectators* (10 articles), *facilities* (8 articles), *marketing/communications* (4 articles), *performance evaluation* (3 articles), and *social sustainability* (2 articles).

Management. In the area of *management*, the main focus of academic work was on strategies and decision-making, while the least emphasis was placed on partnerships/collaboration and future directions. For example, Sartore-Baldwin and McCullough (in press) proposed a new equity-based sustainability and eco-centric approach to management. This approach would require sport organizations to modify their business practices and contribute to the health of our planet. In order to do so, organizations will need to examine the impact of their practices on the environment and determine specific objectives to minimize or eliminate the negative impact. Along the same lines, other scholars have examined the constraints and opportunities for sport organizations to address sustainability objectives (Nguyen, Trendafilova, & Pfahl, 2014), pointing out the importance of understanding the variety

of organizational resources as the key to linking the strategy of the organization with environmental strategy. Furthermore, Trendafilova and Babiak (2013) sought to understand how professional leagues in North America understand, position and deploy environmental practices. Their research indicated that teams and leagues integrate environmental sustainability practices due to defensive factors (i.e., social legitimacy) or social pressures (e.g., demands from customers and spectators). Senior professional sport executives, environmental partners, and experts recognized the importance of and the resulting internal and external benefits to the organization when sustainability practices are incorporated into the core strategy. Although such focus on the environment is not part of sport policy, most practitioners take a voluntary based approach to environmental management and sport management scholars have raised the issue of government involvement and the possibility of developing an environmental policy. For example, Book and Carlsson (2011) examined the development of internal policies in the Swedish sport context, indicating the presence of a passive governance at both the macro- and meso-levels. Despite a general interest in sustainability, no policy is in place that directs sport organizations' and clubs' efforts to address environmental sustainability.

Spectator engagement/behaviours. In the area of *spectator engagement/behaviours*, the main focus of scholarship was on fan behaviours and less emphasis was placed on stakeholder engagement and Green Games. For example, Casper, Pfahl, and McCullough (2017) assessed fan engagement and perception of environmental efforts in the context of intercollegiate sport.

Results indicated that spectators expected the athletic department to have an environmental action plan and engage in sustainable initiatives. This in turn, illustrates the potential sport has to be a platform for behaviour change and to influence everyday fan behaviours. Although spectators were engaged in sustainability practices at sport venues, they were less likely to adopt

these practices as part of their norms and subsequently transfer these pro-environmental efforts at home. In an empirical study, McCullough and Cunningham (2011) examined specific factors that influenced sport spectators recycling behaviour. Their results suggested that intentions to recycle were positively associated with several factors: having previously engaged in recycling, perception of having the time to recycle, sensing other spectators at the sport event wanted them to recycle, and having a significant other who also recycles. A key point is that if fellow spectators believe that recycling is important by demonstrating such behaviour, then other spectators are more likely to feel obligated (i.e., social pressure) to recycle as well and engage in pro-environmental behaviours. Other scholars have taken it a step further and have examined the impact of green stadium initiatives on donor intentions (Jin, Mao, Zhang, & Walker, 2011), indicating that to increase social and financial support of donors, administrators need to instil favourable attitudes toward green stadium initiatives. This could be accomplished by providing systematic information through educational and promotional messages.

Facilities. In the area of *facilities*, the main focus of academic work was on design and operations, and less emphasis was placed on renovation and maintenance. For example, the work of Kellison and Hong (2015) explored the adoption and diffusion of pro-environmental stadium design. The findings indicated that multiple stakeholders (e.g., design firms, media, political leaders, local citizens) were involved in the decision of building a green facility. The primary benefits for facility owners to adopt sustainable designs were economic savings, perception-management opportunities, and demonstration of innovativeness. The hope is that green facilities would increase public awareness of environmental stewardship. Scholarship in this area has expanded to include recreational sport facilities. Stinnett and Gibson (2016) conducted an exploratory study on the levels of institutional adoption of sustainability in the recreational

context, specifically among NIRSA member institutions. Participants in the study indicated that the areas most dedicated to environmental efforts were recycling, followed by bicycle racks, occupancy sensors, while the areas least committed were rebates, having a sustainability committee, and administering a staff training program. Furthermore, results demonstrated that significant difference in adoption levels existed between four-year public and four-year private institutions as well as between large and small enrolment institutions. A similar significant difference existed between institutions with large and small recreational facilities. Although research indicates that efforts to address the environment in facilities do exist, other scholars have expressed scepticism. Porteshawver (2009) studied the topic from a regulatory point of view and believed that current green-building regulations rather do not prevent sport facilities from negatively impacting the environment. This argument is grounded on the fact that the common practice of publicly subsidizing new sport facilities guarantees that the team would play at the largest but not necessary greenest facility. Therefore, Porteshawver encourages team owners to take advantage of state/federal incentives to not only have a green facility but to contribute to the city's overall environment as well.

Marketing/Communications. In the area of *marketing/communications*, the main focus of scholarship was specifically on communications, while marketing was less emphasized. For example, Francis and colleagues (2017) analysed 19 professional soccer teams in the US and the way they communicated sustainability efforts on their websites. Results indicated that some teams are more active than others, for example, teams in the Western Conference were more active setting high standards for sustainability initiatives within the organization. Some of these initiatives included the use of new technology, recycling, and sustainable waste management. Furthermore, the most active teams encouraged and supported local businesses, produce, food

production and waste diversion. Similarly, another study explored how the North American professional sports leagues communicated sustainability principles on their websites (Ciletti, Lanasa, Ramos, Luchs, & Lou, 2010). The findings indicated that communication about environmental practices varies by league and not all sustainability initiatives were assigned the same level of importance. The authors suggested that some teams may not be considering how communicating sustainability efforts could be affecting public consumption of the league's product and in return the public attitudes toward that league. Other scholars have expanded the scope of communication research in relation to the environment and have offered an insight into the internal motives and expectations of customers of a winter sports provider, based on the way in which a winter mountain resort communicated their environmental responsibility (MacIntosh, Apostolis, & Walker, 2013). Results illustrated that consumers had moderate levels of environmental awareness and expected the resort to operate in a manner that limits the negative impact on the environment. Interestingly, although study participants expected the winter provider to conduct business in an environmentally responsible fashion, customers did not actively seek information related to sustainability efforts.

Performance evaluation. In the area of *performance evaluation*, academic work focused more on performance and less on measurement. For example, Mallen and colleagues (2010) assessed the environmental performance of an international multi-sport event. The findings illustrated that although the organizers demonstrated a high level of environmental initiatives, the actual environmental performance was rather weak. The authors pointed out that structural, systematic and cultural barriers may have prevented the actual implementation of many of the sustainable initiatives. To overcome this, Mallen and her colleagues suggest that environmental performance could improve when sustainability goals are adopted early on and are embedded

within the organizational structure as a whole. Along the same line of scholarship, VanWynsberghe (2015) has contributed to the discussion of measuring sustainability efforts of mega-events by studying the Olympic Games. More specifically, he proposes three strategies (bundling/leveraging, before-after control, and sustainability scorecards) of how to implement the International Olympic Committee's Olympic (IOC) Games Impact study (OGI). The objective of the study is to gather data on the overall effects (economic, socio-cultural, and environmental) of the Games, to create a comparable benchmark across all future Olympics, and to help bidding cities identify potential legacies to maximize the benefits from the Games. Critiques have expressed doubts about the reliability of measurements associated with the OGI and its methodology of acquiring data. VanWynsberghe suggests that despite these critiques, the OGI study has the potential to become a summative evaluation tool that could increase knowledge concerning attribution.

Social sustainability. In the area of *social sustainability*, both articles that met the selection criteria addressed community engagement. The first paper focused on mega-events and urban development (Liang, Wang, Tsaur, Yen, & Tu, 2016). The authors attempted to identify the impact of the 2010 Taipei International Flora Exposition on the local community from the perspective of residents. Results indicated that the local community perceived infrastructure development, natural resources protection, and cultural heritage as predictors of sustainability. The second paper focused on the recreational sport, health and environmental policy in Nova Scotia, Canada (Pitter, 2009). The author pointed out that governments and community groups need to work together to address the growing rate of obesity in Canada. He further underlines how the state, civil society, and commercial institutions play various roles in the development of recreational sport space. Findings indicate that while some community groups maintain the belief

that clean air and quiet are essential to health, others maintain the belief that caring for the environment is more than sufficient for good health. Despite the differences, both sides of the argument agree that outdoor environments contribute to health promotion.

Areas in which the GSA works with the sport sector

The GSA was established in 2011 by “Seattle Seahawks, Portland Trail Blazers, Seattle Sounders FC, Seattle Mariners, Seattle Storm, Vancouver Canucks and the Natural Resources Defense Council with support from Bonneville Environmental Foundation, Green Building Services and Milepost Consulting” (Green Sports Alliance, 2017). The GSA intends to bring together various stakeholders (e.g., sport organizations, vendors, sponsors) with an invested interest to promote environmental sustainability. This platform allows for all stakeholders to strive to meet their mutual interests while meeting their individual organizational goals. To this end, the GSA sponsors several mini-conference, an annual conference/summit, and hosts regular webinars. Further, the GSA assists its members to achieve sustainable goals and to promote successful campaigns and innovations in the space of sustainability and sport. Our analysis indicated that the GSA is working with the sport sector in various areas related to environmental sustainability. More specifically, the GSA has facilitated a macro-level coordination between sport organizations and stakeholders. Additionally, the Green Sports Alliance facilitates networking and introductions between sport organizations and stakeholders like HoK Architectural Firm and sport organizations seeking to build LEED certified facilities (i.e., University of Washington Athletics, Atlanta Falcons).

Gap(s) between sport management scholarship and the efforts of the sport sector

The majority of academic work on environmental sustainability focused on management, fan behaviour and facilities management. Although these three areas were most present in the

work of sport management scholars, we need to point out that in management only 19% of all initially identified articles (n=84) addressed sustainability, 12% addressed fan behaviour and 10% addressed facilities management. When one looks at the numbers, it is clear that more scholarly work is necessary if we are to keep up with the efforts of the sport sector when it comes to environmental sustainability. It is even more discouraging with the areas of marketing/communication, performance evaluation, and social sustainability. In the area of marketing/communication only 5% of articles addressed environmental sustainability, in the area of performance evaluation only 4%, and in the area of social sustainability only 2%. One area in which there were no articles published or in press was *procurement*. On the positive side, it is encouraging to see that academic work is addressing the areas in which the sport sector is working with the GSA to tackle the negative impact sport activities and events have on the natural environment. We hope this trend continues and that by working together both scholars and practitioners can be part of the solution rather than part of the problem.

Conclusions

Our rapid review provided knowledge about the areas in which the sport sector is working with the assistance of the GSA to address environmental sustainability. Furthermore, our rapid review identified scholarly work in the area of sustainability and more specifically whether sport management academics are conducting research to advance the environmental sustainability efforts in the sport sector. As we pointed out in the section above, a gap exists between the sport sector efforts and academic work. This gap relates not only to the quantity of published or in press work but also to the specific areas which need further attention. For example, most work in the category of management focused on strategy and decision-making but more needs to be done to address partnerships and international collaborations. Environmental

sustainability requires a collective effort at all levels (local, regional, national, and international) and if we are to achieve success, all stakeholders need to be involved. In other words, a strategic and a well-planned collaboration between practitioners and scholars could lead to a more efficient use of limited financial and human resources. It is critical that in this process a clear channel of communication is established in addition to resource sharing when possible. An ongoing open dialogue between practitioners and scholars can not only assist in current environmental efforts but can also identify areas of potential collaborative endeavours.

In the category of facilities management, most works focused on design and operations and less on renovation and maintenance. This makes sense to a certain degree as new sport facilities are built relatively frequently when compared to other public facilities. In addition, prominent architecture firms such as Populous have made sustainability a central feature of their project portfolios. Pro-environmental stadium design is becoming a more mainstream occurrence and for sport organizations, the construction of green arenas, ballparks, and stadiums is the most visible symbol of environmental efforts. However, more research is necessary in the area of renovation and maintenance. When it comes to addressing sustainability renovation, in general, it is more challenging than building an entire new facility. Maintenance is a critical part of sustaining green efforts and should be a key component in facilities management research.

In the category of marketing/communication, scholarly work focused more on communication and less on marketing. This could be due to the fact that clear and specific communication about sustainability efforts is part of the marketing campaign, thus making it difficult to separate marketing environmental efforts from communicating sustainability. Nonetheless, scholars who have the expertise in these areas should continue on exploring and evaluating how effective marketing sustainability is and perhaps the effect it has on fan

behaviour. Related to evaluation, in the category of performance evaluation, scholarship focused more on performance and less on evaluation. This is interesting as both are connected and one cannot report on performance unless a good system for evaluation is in place. Developing effective evaluation metrics should be a priority for the field of sport management as clear metrics would allow not only for the easy measure but also for information sharing among sport entities, practitioners and other stakeholders.

Thus, it is necessary for the sport sector to work with academics more closely than ever before to find worthwhile solutions to immediately combat climate change (Kates et al., 2001). Specifically, Kates and colleagues stated that “combining different ways of knowing and learning will permit different social actors to work in concert, even with much uncertainty and limited information” (Kates et al., 2001 p. 641). Moreover, with the time sensitive nature of addressing climate change it is becoming more and more apparent that action is needed given the shared responsibility within the sport sector (Sartore-Baldwin & McCullough, in press). There are many opportunities to be leveraged in the efforts to combat and reduce the negative impacts of climate change by using the sport sectors’ social platform and by leveraging the wealth of knowledge practitioners and sport management academics can provide. However, as we indicate here in this article there are still gaps to be bridged to combat the uncertain and limited information mentioned by Kates and colleagues. These efforts can be as simple as using proper research methods and theoretical frameworks to create effective fan engagement campaigns (Trail, 2016) to conducting materiality assessments to evaluate the priorities of various stakeholder groups. Additional cross and inter-disciplinary research can prove to be quite insightful to ensure the success of the sport sector’ sustainability efforts. Ultimately, academics and practitioners must work more closely to reduce the environmental impact of the sport sector and engage sport spectators to address climate change more broadly in their everyday lives. We recommend that this rapid review serves as a foundational precursor for a comprehensive systematic review examining the gaps and alignment with the sport sector efforts and the complete body of knowledge concerning

environmental sustainability in the sport sector. To this end, future scholarly endeavours expand the scope of review to include work in the areas of leisure, recreation, sport tourism and environmental education. This, in turn, would allow for a holistic view of sustainability efforts not only in the realm of professional and collegiate sport, but outside these domains as well. Furthermore, regardless of the particular setting (e.g., tourism, collegiate sport, leisure), it is important to address the pressing need of educating students on the topic of sustainability if we are to produce professionals equipped with the skills and knowledge to serve as leaders in sustainability.

In conclusion, we present the first rapid review of literature focused on the issue of how sport management scholars are addressing the environmental sustainability efforts of the sport sector. If we are to be responsible scholars and benefit society in a practical manner, we need to better communicate with the sport sector to not only understand their changing needs but to be able to learn what areas of environmental sustainability need further investigation, and what new areas need to be addressed. This assumes a continuous communication between all stakeholders as an open dialogue is essential for success resulting in collaboration to advance environmental sustainability in the sport sector.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Table 1

Management	Spectators	Facilities
Corporate social responsibility and environmental sustainability: Why professional sport is greening the playing field, Trendafilova, S., Babiak, K., & Heinze, K. (2013)	Is going green worth it? Assessing fan engagement and perceptions of athletic department environmental efforts, Casper, J., Pfahl, M., & McCullough, B. (2017)	“What could be” in Canadian sport facility environmental sustainability, Mallen, C. & Chard, C. (2012)
Equity-based sustainability and ecocentric management: Creating more ecologically just sport organization practices, Sartore-Baldwin, M., & McCullough, B. (in press)	Residents’ perceptions of environmental impact of the 2008 Beijing Green Olympic Games, Jin, L., Zhang, J., Ma, X. & Connaughton, D. (2011)	The adoption and diffusion of pro-environmental stadium design, Kellison, T. & Hong, S. (2015)
Understanding strategic corporate environmental responsibility in professional sport, Trendafilova, S. & Babiak, K. (2013)	Impact of green stadium initiatives on donor intentions toward an intercollegiate athletic programme, Jin, L., Mao, L., Zhang, J. & Walker, M. (2011)	Environmental sustainability in sport facility management: A Delphi study, Mallen, C., Adams, L., Stevens, J. & Thompson, L. (2010)
The Natural Resource-Based View of the firm (NRBV): Constraints and opportunities for a Green team in professional sport, Nguyen, S., Trendafilova, S., & Pfahl, M. (2014)	Factors associated with an athletic donor’s intention to donate to green stadium initiatives of a collegiate athletic program, Jin, L., Zhang, J., Pitts, B., Connaughton, D., Swisher, M., Holland, S. & Spengler, J. (2015)	Actualizing environmental sustainability at Vancouver 2010 venues, Ponsford, I. (2010)
Crossing boundaries: An examination of sustainability department and athletics department collaboration regarding environmental issues, Pfahl, M., Casper, J., Trendafilova, S., McCullough, B. & Nguyen, S. (2015)	Sport teams as promoters of pro-environmental behaviour: An empirical study, Inoue, Y. & Kent, A. (2012)	Sustainability and recreational sports facilities: An exploratory study regarding levels of institutional adoption, Stinnett, B. & Gibson, F. (2016)
A diagnosis of environmental awareness in sport and sport policy, Book, K. & Carlsson, B. (2011)	Residents’ perceptions of environmental and security issues at the 2012 London Olympic Games, Konstantaki, M. & Wickens, E. (2010)	Green sports facilities: Why adopting new green-building policies will improve the environment and the community, Porteshawver, A. (2009)
Legitimizing sustainability efforts through strategic partnerships, McCullough, B., Trendafilova, S. & Picariello, M. (2016)	Transporting 2014 FIFA World Cup to sustainability: Exploring residents’ and tourists’ attitudes and behaviours, Malhado, A. & Rothfuss, R. (2013)	Under review: Stadium construction and state environmental policy acts, Porteshawver, A. (2010)
Athletics department awareness and action regarding the environment: A study of NCAA athletics department sustainability practices, Casper, J., Pfahl, M. & McSherry, M. (2012)	Identifying the influences on sport spectator recycling behaviours using the theory of planned behaviour, McCullough, B. (2013)	A global perspective on the environmental impact of golf, Wheeler, K. & Nauright, J. (2006)
A conceptual model to understand the impetus to engage in and the expected organizational outcomes of green initiatives, McCullough, B. & Cunningham, G. (2010)	Recycling intentions among youth baseball spectators, McCullough, B. & Cunningham, G. (2011)	
Blue skies over Beijing: Olympics, environments, and the People’s Republic of China, McLeod, C., Pu, H. & Newman, J. (in press)	The benefits of becoming a green company: A corporate marketing approach, McCullough, B. & Melton, E. (2017)	
Ecological modernization and the Olympics: The case of golf and Rio’s “Green” Games, Millington, R., Darnell, S. & Millington, B. (in press)		
The potential contribution of the 2010 soccer world cup to climate change: An exploratory study among tourism industry stakeholders in the Tshwane metropole of South Africa, Otto, I. & Heath, E. (2009)		

Management	Spectators	Facilities
The interpretation of environmental sustainability by the International Olympic Committee and Organizing Committees of the Olympic Games from 1994 to 2008, Paquette, J., Stevens, J. & Mallen, C. (2011)		
Blame it on Rio: Isomorphism, environmental protection and sustainability in the Olympic movement, Pentifallo, C. & VanWynsberghe, R. (2012)		
Sustaining the race: A review of literature pertaining to the environmental sustainability of motorsport, Dingle, G. (2009)		
Strategic issues associated with the development of internal sustainability teams in sport and recreation organizations: A framework for action and sustainable environmental performance, Pfahl, M. (2010)		

Table 2

Marketing/communication	Performance/evaluation	Social sustainability
Investigating the role of corporate credibility in corporate social marketing: A case study of environmental initiatives by professional sport organizations, Inoue, Y. & Kent, A. (2012)	The assessment of the environmental performance of an international multi-sport event, Mallen, C., Stevens, J., Adams, L. & McRoberts, S. (2010)	Mega-event and urban sustainable development, Liang, Y., Wang, C., Tsaur, S., Yen, C. & Tu, J. (2016)
Sustainability initiatives in professional soccer, Francis, T., Norris, J. & Brinkmann, R. (2017)	Ecological modernization and the 2014 NHL sustainability report, Johnson, J. & Ali, A. (in press)	Finding the Kieran way: Recreational sport, health, and environmental policy in Nova Scotia, Pitter, R. (2009)
Sustainability communication in North America professional sport leagues: Insights from web-site self-presentations, Ciletti, D., Lanasa, J., Ramos, D., Luchs, R. & Lou, J. (2010)	The Olympic Games Impact (OGI) study for the 2010 Winter Olympic Games: Strategies for evaluating sport mega-events' contribution to sustainability, VanWynsberghe, R. (2015)	
Environmental responsibility: Internal motives and customer expectations of a winter sport provider, MacIntosh, E., Apostolis, N. & Walker, M. (2013)		

About the Authors

Sylvia Trendafilova, Ph.D., is an Associate Professor of sport management in the Department of Kinesiology, Recreation and Sport Studies at the University of Tennessee. Her research focuses on the sustainable management of sport and explores corporate social responsibility and the benefits these activities have on different sport organizations. Her work is informed by theories from political economy, sociology, and behavioral analysis.

Brian McCullough, Ph.D., is an Assistant Professor in the Sport Administration and Leadership program at Seattle University. His research interests concentrate on the managerial decision-making processes involving environmental sustainability initiatives among upper management, determining the environmental impact of sport spectators, and using the context of sport to influence environmental behaviors of sport spectators' game day and everyday life.

Public Interest Statement

Global industries are confronted with a necessary response to the impacts of climate change. Therefore, organizations have adopted environmental sustainability initiatives to reduce their impact on the environment. These efforts can be magnified through the collaboration of practitioners and academics by bringing their respective expertise together to solve complex environmental sustainability problems. The sport sector is not exempt to these challenges. Sport practitioners are at a distinct advantage over other industries because of the social platform and influence that sport has than any other industry. Sport organizations can use their social platform to not only reduce their environmental impact but also engage sport fans to behave in more sustainable ways. Trade organizations, like the Green Sport Alliance in North America, have been created to facilitate the sustainability movement in sport. In this article, we examine how sport management academic researchers have addressed the thematic topics of concern in sport sustainability trade organizations such as the Green Sport Alliance.

Appendix

List of Articles Included in the Systematic Review

- Book, K. & Carlsson, B. (2011). A diagnosis of environmental awareness in sport and sport policy. *International Journal of Sport Policy and Politics*, 3(3), 401-416.
- Casper, J., Pfahl, M., & McCullough, B. (2017). Is going green worth it? Assessing fan engagement and perceptions of athletic department environmental efforts. *Journal of Applied Sport Management*, 9(1), 106-129.
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