Towards Improving Knowledge Capitalization System for Sport Events Legacy

Malika Grim-Yefsah[1][a] and Benedicte Bucher[2]
[1]*ENSG, 6-8 Avenue Blaise Pascal, 77420 Champs sur Marne, France*
[2]*IGN, 73 Avenue de Paris, 94165, Saint Mandé, France*

Keywords: Knowledge Management, Knowledge Capitalization, Knowledge Management System, Sport Events, Legacy, UML.

Abstract: Knowledge Management is a way to answer the problem of capitalizing on the companies' knowledge. Knowing that hosting sports events (SE) requires organizers to learn from past events to not repeat mistakes, we examine knowledge management in a sport events legacy (SEL). Thus, in this paper, we propose in first, two conceptual models based on UML; one for the SE, another for SEL. Secondly, we propose a system to manage SEL to assist in the process of data acquisition and capitalization on SE knowledge. This system helps to create an open collaborative platform for consultation, visualization of the spinoffs of sport events. It is intended to be used by public policies, territories, journalists, citizens, historians and all others. We propose also to take into account the spatiotemporal aspects of SE.

1 INTRODUCTION

The mega sport events, like Olympic and Paralympic Games, can spread a general spirit of optimism as create new jobs, construct new iconic buildings, implement new transports solutions. However, some citizens see at the growth population of a city, the increasing of price of apartments, the insecurity. The problem is that the same legacy can be positive and negative at the same time. One of the request of our institute, IGN (National Institute for Geographical and Forest Information), is understanding of the sport events legacy. For organising the Olympic Games in Paris in 2024, the IGN will coordinate provision of the Olympic Games' geographical information for the state by involving all public stakeholders concerned. The 2019 milestones of IGN are:

- Study of needs in geographical information, by listing data, tools and platforms that exist already and by identifying the developments required and potential innovative services.
- Constituting a network of stakeholders involved in the Olympic Game, treating the issue of Olympic and Paralympic game' key legacies.

Our work is focused on the issue of Olympic and Paralympic game' key legacies. Generally speaking, the legacy is any outcomes that affect people or space caused by structural changes that stem from sport events as Olympic and Paralympic Games.

We agree (Parent, MacDonald, and Goulet, 2014) who consider that hosting sports events requires organizers to learn from past events to not repeat mistakes. Thus, knowledge acquired in the past should be managed to allow more effective sport events legacy management: it means acquire, capitalize and use knowledge of passed sport events to improve future. It's the role of knowledge management. The questions guiding this study are: (1) what elements of a sport event and sport events legacy do we acquire, store, and capitalize? (2) Which appropriate system should be implementing to capitalize knowledge of Sport Events Legacy?

The paper is organised into six sections. Following this introduction, the next section deals with the literature review on knowledge management. In the third section, we present the concept of sport event and sport events legacy and we model them using UML diagrams. In the fourth section, we describe our architecture of Knowledge

[a] https://orcid.org/0000-0002-6743-0692

Grim-Yefsah, M. and Bucher, B.
Towards Improving Knowledge Capitalization System for Sport Events Legacy.
DOI: 10.5220/0008348102640270
In *Proceedings of the 11th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management (IC3K 2019)*, pages 264-270
ISBN: 978-989-758-382-7

Capitalization System KM-oriented for Sport Events Legacy. The fifth section proposes a methodology to test our technical framework. Finally, the conclusions and perspectives are given.

2 THEORICAL FRAMEWORK

In this section we examine concepts composed Knowledge Management (KM). Since the early nineties interests has increased regarding KM in organizations. The knowledge management is viewed by Barclay (Barclay, 2004) "*as a process of identification, formalization, disseminating and use of knowledge in order to promote creativity and innovation in companies*".

Knowledge is defined as being justified true belief (Nonaka, and Takeuchi, 1995). Knowledge is often distinguished between tacit knowledge and explicit knowledge (Polanyi, 1967). (Nonaka, Toyama and Konno, 2000) suggest that explicit knowledge can be expressed in a formal and systematic language and is easily shared whereas tacit knowledge is personal and includes subjective insights, intuitions and hunches. Tacit knowledge focuses on 'knowing how' rather than 'knowing that' (Sternberg, R. J. And al. 2000). Then, explicit knowledge can be codified (e.g. writing or drawing) and articulated since it can be expressed formally and systematically but tacit knowledge corresponds to skills, senses, intuition, physical experiences, 'job secrets'. (Davenport, and Prusak, 1998) considered a knowledge hierarchy that includes data, information, and knowledge, while (Ackoff, 1989) distinguished DIKUW (data, information, knowledge, understanding, and wisdom, built upon each other):

- *"Wisdom is located at the top of a hierarchy of type.*
- *... Descending from wisdom there are understanding, knowledge, information, and, at the bottom, data. Each of these includes the categories that fall below it…*
- *Data are symbols that represent properties of objects, events and their environments.*
- *Information systems generate, store, retrieve, and process data. In many cases their processing is statistical or arithmetical. In either case, information is inferred from data.*
- *Knowledge is know-how, for example, how a system works. It is what makes possible the transformation of information into* instructions. *It makes* control *of a system possible."*

In below, we define different activities include in KM such as identification, creation, storage, capitalization, and transfer.

Knowledge identification refers to the act of distinguishing the knowledge that is needed in order to perform a given task (Bera, Burton-Jones, & Wand, 2011). The source for both tacit and explicit knowledge may be internal or external for a given organization.

Knowledge creation is referred to the production of new knowledge, or knowledge creation, occurs through a spiral of the four modes of the SECI process (Nonaka, and Takeuchi, 1995). The four modes of the SECI process include socialization, or tacit to tacit knowledge, externalization, or tacit to explicit knowledge, combination, or explicit to explicit knowledge, and internalization, or explicit to tacit knowledge.

According to Grundstein (Grundstein, 2012), capitalizing on company's knowledge means considering certain knowledge used and produced by the company as a storehouse of riches and drawing from these riches interest that contributes to increasing the company's capital. In fact, the knowledge management is a way to answer the problem of capitalizing on the company's knowledge.

Knowledge transfer is an important part of knowledge Management (Davenport, and Prusak, 2000). It refers to ensuring that knowledge is transferred throughout the company or between organisations from the sender to the receiver who needs that knowledge. (Davenport, and Prusak, 1998) proposed this definition:

$$\text{Transfer} = \text{Transmission} + \text{Absorption (and Use)} \quad (1)$$

Please, note here the important distinction between Transmission and Transfer. This equation indicates that transmitting knowledge by sending or presenting explicit knowledge is not sufficient for transferring it. Based on the results of our doctoral research (Grim-Yefsah, 2012), transferred knowledge transferred may be applied or used in three different forms: instrumental use, conceptual use, such as influencing others; and symbolic use, such as using the knowledge to justify other actions.

Knowledge storage includes the retention, protection, and maintenance of knowledge in various mediums such as individuals, documentation, computers, and technology (Anand, and Singh, 2011). Knowledge storage may also be a tool used in knowledge transfer.

We agree (Zyngier, and Venkitachalam, 2011) who considered Knowledge Management as an

essential tool in order to achieve competitive advantages. Based on this idea, we design a tool oriented-KM in aim to capitalize elements of knowledge acquired in the sport event passed. The capitalization should be managed to allow more effective future (or present) sport events management. We focus on concern regards system modelling and developing KM solutions.

3 CONCEPTUAL MODEL

This section deals with concepts that are employed in this paper regarding to context and elements of mega sporting events such as Olympic and Paralympic Games and the benefit to be gained from the legacy that will be left behind. In first part, we present the concept of sport event, and then our conceptual model. In the second part, we start with definition of sport events legacy, and then we propose a conceptual model too.

We select UML as the modelling language for modelling concepts of sport event and sport events Legacy. While UML provides a number of diagrams for modelling, these diagrams and models are generic and do not capture the details specific to sport events and sport events legacy. Therefore, we model the conceptual details, i.e., the sport events concepts and the relationship of concepts based on the domain literature using the class diagram. Modelling of class diagram is an important step in understanding the vocabulary.

3.1 Sport Events

A sport event is considered as a planned event. According to (Getz, 2008) "*Planned events are spatial–temporal phenomenon, and each is* ***unique*** *because of interactions among the setting, people, and management systems- including design elements and the program*".

According also to Getz (Getz, 2008) planned events are controlled and reported in order to achieve economic, social or environmental objectives.

Finally, from these definitions we retain three dimensions which we introduce into our conceptual model (see Figure 1): the temporality, the location and the uniqueness.

This uniqueness is considered in several ways:

- Interactions between the environments; their internal organization which can include the budget, the goals targeted by the event, etc.
- Interactions between people; the personalities organizing the events,
- The management systems for these events, namely the design, planning and programming elements they generate.

We model the two dimensions 'temporality' and 'location' as attributes of 'Identification' class and the 'Unique characteristics' as a class.

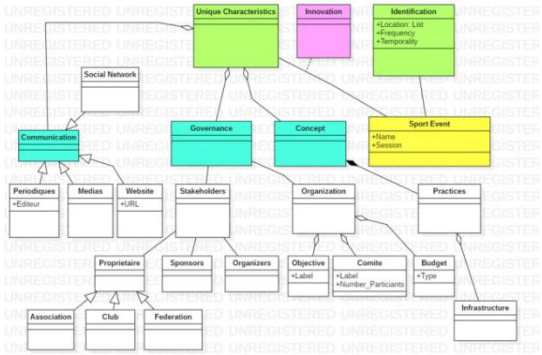

Figure 1: Conceptual Model for Sport Events.

Chappelet (2014) proposes the following definition of sport events, "*a sport event belongs to a particular place and returns regularly, usually every year sometimes every two years, without interruption except exceptional. The owner of this event is a local entity, usually a non-profit organization or community, but not a national or international organization*".

From this definition, we retain that the author identifies the following characteristics related to sport events:

- The specific location,
- The frequency (Recurrence),
- The local governance (owner of the event, association or community),
- The longevity.

This author has added the frequency characteristic which is not an element of the definition presented in begin of this section. In our understanding it is a significant characteristic. Thus, we add it to our proposal conceptual model.

Bessy (2014) was interested by innovation in events, in particular in sport events or touristic events. Thus, he finds that innovation is at the level of the concept of the events, in their governance and in their communication. From Bessy' analysis we keep two elements: communication of sport events and the innovation.

At last, we complete our proposal conceptual model by adding all these dimensions (see Figure 1).

3.2 Sport Events Legacy

The legacy of mega sporting events can be perceived in several ways. In one hand, Legacy is determined by benchmarking, based on past experiences from other mega events. In other hand, Legacy is determined also by macro-economic indicators.

(Cashman, 2005) consider that legacy is often assumed to be self-evident, so that there is no need to define precisely what it is.

(Preuss, 2007) proposed the following definition "*Irrespective of time of production and space, legacy is all planned and unplanned, positive and negative, tangible and intangible structures created for and by a sport event that remain longer than the event itself* ". This definition highlights six dimensions. However, most prevent studies and bid committees focus on only (planned, positive, tangible) (Cashman, 2005).

(Preuss, 2007) identified some impacts of mega sport events: economic impact, urban development, employment impacts, environmental and social impacts. He precise that the sport events accelerate city development by built some sport infrastructures, training sites, villages of athletes, technical officials and media. In another hand, the supervisors of technical structure developed power plants, telecommunication networks, and cultural attractions.

(Chappelet, 2012) proposes this definition "*The legacy of a mega sport event is all that remains and may be considered as consequences of the event in its environment*".

Please, note in this definition the association between sport events and legacy. (Hinch, and Ramshaw, 2014) highlight a first explicit association between sports events and legacy (heritage) through the concept of 'Sport Heritage Attractions'.

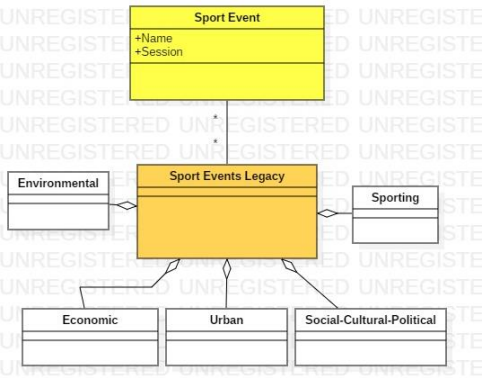

Figure 2: Conceptual Model for Sport Events Legacy.

The IOC (2009) outlines five Games legacies: Sporting; Social, cultural and political; Environmental; Economic; Urban.

Based on these definitions, we retain five dimensions which we use in our conceptual model (see Figure 2). Thus, the sport events legacy (SEL) is described through five classes: 'economic', 'environmental', 'cultural-social-political', 'urban' and 'sporting'.

Finally, the conceptual model of sport events and the conceptual model of sport events legacy form a one Global Conceptual Model for sport events (see Figure3).

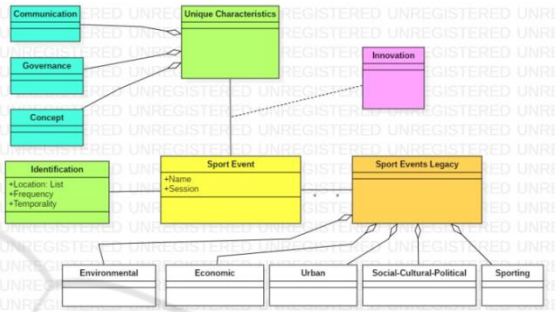

Figure 3: Global Conceptual Model for Sport Events.

Sport event legacy is linked to a sport event because the legacy is any outcomes that affect people or space caused by structural changes that stem from sport events.

4 CAPITALIZATION SYSTEM FOR SPORT EVENTS LEGACY

Our aims are, in one hand, to use the KM for addressing the different facets of sport events legacy. In other hand, to implement the KM solutions which rely on the use of information technology to collect and disperse the knowledge of sport events and sport events legacy. Although (Halbwirth and Toohey 2001) introduced the concept of knowledge management in major sport events associated with the 2000 Sydney Olympic Games, gaps remain, including in the knowledge management system. Thus, we focus on the architecture of Knowledge Capitalization System KM-oriented for Sport Events Legacy.

Generally speaking, the steps of creating new artifacts in information system are:

- Constructs, which provide the vocabulary used to define and understand problems and solutions

- Models, which are designed representations of problems and solutions
- Methods, which are algorithms, practices, for performing task
- Architecture, components, interfaces, (or code) which is the development that realize the processes and services.

In the third section, we product the constructs and models which ensure the creation of database for storage, retention and protection of data. In this section, we describe the architecture of the capitalization System for sport events legacy. The main goal of the Knowledge Management process is to capitalize, share and transfer knowledge internally and externally (for more details see Clarke, 2011). Then, we implement package for each activities include in KM process.

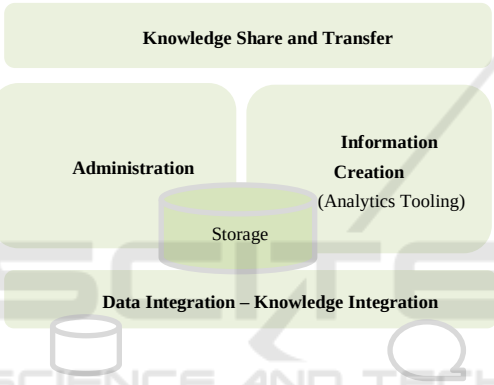

Figure 4: Architecture of Knowledge Capitalization system.

The architecture of our technical framework (see Figure 4) is as follow:

- The Data (Explicit Knowledge) integration is being by automatic instruments: example use the tool for Extract-Transform-load for including data in the platform from files or databases. Or use forms, when, for example, a territorial agent fills in a form at giving the name of sport event, frequency, location: these inscriptions are data. He can input explicit knowledge as document, video.
- Information Creation: Information is the results of inferences from relevant data. Information is the data augmented by additional items inferred or calculated using analytics tooling. In this package, users can create storyboards.
- The administration package is used to rolling upgrades, improved diagnostic. Also, to ensure the security, data consistency, etc.
- The knowledge Share and transfer: this package is composed by interfaces for uploading explicit knowledge and wiki to exchanges with users. First, users upload documents, video, etc. Secondly they use the wiki to share their contexts and create new meanings through interactions. The wiki is a way of organizing that is based on the meaning it creates, rather than a form of organization such as hierarchy.

In fact, our proposal 'Knowledge Capitalization System KM-oriented' contributes to manage sport events knowledge to improve the acquisition, creation, storage, elaboration and transfer stages.

5 METHOD FOR TOOL USE

This section describes the method for our tool use as a series of four stages. This method supports the 'identification', 'acquisition and creation', 'elaboration', and 'transfer' stages. One other hand, this method is used to evaluate the usability of our technical framework. We based on the concept 'usability' defined in ((Kitchenham and Pfleeger, 1996), (Garcés and a., 2017 p.134)).

First Stage: identification area and data collect

This first stage is to identify the area of sport event and knowledge and data needs and sources.

As a starting point of this work, we have modeled the sport event (see Figure 3) based on the literature. This modelization helps us to structure the data and knowledge we collect. Each dimension of this model is described by:

- Data, e.g. organizational data like name of sports federations, date, address, etc.; types of building materials used for Olympic Villages, number of training sites; number of villages of athletes, etc. these data capture the value of sport event.
- Explicit knowledge, e.g. documents, prospectus,reports, articles about sport events.
- Video and model e.g. plans for future city development.
- Other e.g. security, technological.

According to (Preuss, 2007) the knowledge which describe sport event legacy can be tangible or intangible (see Table 1). We looked some examples of knowledge.

The knowledge sources varied, e.g. documents, past experience, people. Some interviews will be conducted. The interviewee profile considered ideal for the interviews are organizers, sponsors, managers, participants, volunteers and spectators. We will review Web sites and other available data sources of sport events to again additional data and knowledge.

Table 1: Types of Knowledge which describe sport event.

type	Tangible	Intangible
Urban	Transport solutions	Notoriety
	Olympic village flats. New iconic buildings	Image
	Infrastructure	
Societal	New job	Acquired skills
	Receptions dispositions	Tourism attractiveness
	Capacity of the actors to produce event	Territory attractiveness
Sporting	People interested and active in sport	
Political	Free public services (security, etc.)	
Environmental	Capacity of the actors maintain infrastructure	Quality of life
	Types of materials	Sustainability city
Economic	New hotels, new restaurants, price increases, etc.	

Second Stage: Acquisition and creation

In the first stage the data (Knowledge) and respective sources were identified and collected.

This stage addresses two steps. First, if the identified data (knowledge) already exist in our tool, it will simply update them or acquires the sources. Second, if the identified data (knowledge) already do not exist, then it will be create with respective sources.

Third Stage: Elaboration

In this stage we deal with 'transform data into information', 'derive new information from existing' using analytics tooling and 'creation of storyboards'.

Fourth Stage: Transfer Knowledge

Ultimately, the knowledge will be transfer to public policies, territories policies, and futures organizers of sport events. In other hand, knowledge will be used by citizens, historians, journalists and others. Only, transferring explicit knowledge through documents and reports it's possible using our tool.

This stage will be in an iterative fashion. Technology is an important enabler of knowledge management, more precisely using collaborative tool for explicit knowledge e.g. web site, forum.

Our case study concerns the sport event 'Africa up of nations 2019'. This study is in progress. We focused, in first step, only on the identification of data (explicit knowledge) without interviewees. In second step, we will take into account the human. We agree (Chugh, 2018) who demonstrates *"for any successful tacit knowledge transfer initiative in an organisation, it is vital that the identified human, social and culture factors are tackled to ensure success. However, all organisational initiatives towards tacit knowledge sharing will be futile if employees are not motivated to share."*

6 CONCLUSION

The purposes of this paper are (1) to understand concepts of sport events and sport events legacy. (2) To examine the theory and practice of knowledge Management processes using the sport events legacy as the empirical setting. (3) Building a knowledge capitalization system for sport events legacy according to (Parent, MacDonald, and Goulet, 2014) that showed that hosting sports events requires organizers to learn from past events to not repeat mistakes.

As a starting point of our work, we model the sport event and sport events legacy based on the literature using UML diagrams. This modeling helps us to structure the database of our knowledge capitalization system for sport events Legacy. The aim is to propose a uniform way to represent several sport events and sport events legacy. The proposed UML model can be used for the modeling of other case study of sport events. Then, using the information system methodology enabled us to construct architecture of knowledge capitalization system KM-oriented. We created a tool composed by five (05) components. Each component is required to establishing the KM-oriented.

Our proposed artifact requires identification and handling of the elements of data of sport events that could be stored, analyzed, understood, customized and transferred for use. However, this artifact merits to be demonstrated through a case study within a real sport event. Our case study is in progress.

This work extends the KM discipline, practically, by incorporating sport events and sport events legacy as an important field within KM practice, and providing a specialized knowledge capitalization socio-technical tool.

There are several limitations of the current study that need to be addressed. First, when such a research design is utilized, the case study should validate the framework. In another hand, the case study is the generalizability of the results needs to be addressed. However, our case study is in progress.

A more limiting factor regarding the generalizability of this research deals with

national/cultural issues. According to (Chugh, 2018) culture (personal and organizational) and language could be barriers of knowledge transfer.

One other limitation of our approach in this paper needs is take in account tacit knowledge.

The main perspective is validation of the architecture of knowledge capitalization system KM-oriented for sport events legacy through various case studies. Another perspective is to take into account the spatiotemporal aspects of sport events.

REFERENCES

Ackoff, R.L., (1989). From data to wisdom, *Journal of Applied Systems Analysis* 16 (1989) 3–9.

Anand, A., & Singh, M. D. (2011). Understanding Knowledge Management: A literature review. International Journal of Engineering Science and Technology, 3(2), 926–939.

Barclay, R., Murray, P. C., (2004). What Is Knowledge Management?, Knowledge Praxis.

Bera, P., Burton-Jones, A., & Wand, Y. (2011). Guidelines for designing visual ontoloties to support knowledge identification. MIS Quarterly, 35(4), 883–908.

Bessy, O. (dir.) (2014). *L'innovation dans l'événementiel sportif: De l'attractivité touristique au développement territorial*. PUS, Voiron, France, p. 244.

Cashman, R. (2005). The bitter-sweet awakening. The legacy of the syndney 2000 Olympic Games. Sydney: Walla WallaPress.

Chappelet, J.-L. (2012). Mega sporting event legacies: a multifaceted concept.

Chappelet, J.-L. (2014). Les événements sportifs patrimoniaux comme vecteur de développement territorial. In O. Bessy, (Dir.), *L'innovation dans l'événementiel sportif: De l'attractivité touristique au développement territorial* (pp. 24-35). Voiron: PUS.

Clarke, S. (2011). Support network. Olympic Review, 62–66.

Davenport, T. H and Prusak L., (1998), Working knowledge: How organizations manage what they know. Boston, MA, *Harvard Business School Press*.

Chugh R. (2018). Tacit Knowledge Transfer in Australian Universities: Exploring the Barriers and Enablers. MATEC Web of Conferences 210, 04054 2018.

Davenport, T.H., and Prusak, L. (2000). Working Knowledge – Practitioner approaches to knowledge in organizations. Boston, Harvard Business School Press.

(Garcés, L. Ampatzogloub, A. Avgerioub, P. Nakagawaa, E.Y. (2017), Quality attributes and quality models for ambient assisted living software systems: A systematic mapping. Information and Software Technology, 82, 121-138.

Getz, D. (2008). Event tourism: Definition, evolution, and research. *Tourism Management*, 29, 403-428.

Grim-Yefsah, M. (2012). Knowledge Management and Outsourcing. Doctoral thesis, Computer science, University of Paris-Dauphine, France.

Grundstein, M., (2012). Three Postulates That Change Knowledge Management Paradigm, In Huei-Tse Hou (Ed.) New Research in Knowledge Management, Models and Methods (Chap. 1), pp. 1-26.

Halbwirth, S., and Toohey, K. (2001). The Olympic Games and knowledge management: A case study of the Sydney Organising Committee of the Olympic Games. European Sport Management Quarterly, 1(2), 91–111.

Hinch, T., and Ramshaw, G. (2014). Heritage sport tourism in Canada. Tourism Geographies: An International Journal of Tourism Space, Place and Environment, 16(2), 237–251.

IOC (2009). 2018 Candidature Acceptance Procedure. Lausanne: International Olympic Committee.

Kitchenham, B. Pfleeger SL. (1996). Software Quality, IEEE software.

Nonaka, I. and Takeuchi H. (1995). The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation. Oxford University Press.

Nonaka, I. Toyama, R. and Konno, N. (2000). SECI, Ba and leadership: a unified model of dynamic knowledge creation, Long Range Planning, 33 (1), 5-34.

Parent, M. M., MacDonald, D., & Goulet, G. (2014). The theory and practice of knowledge management and transfer: The case of the Olympic Games. *Sport Management Review*, *17*, 205–218.

Polanyi, M. (1967). The tacit dimension. Garden City,
NY: Doubleday & Co.

Preuss, H. (2007). The Conceptualisation of Measurement of Mega Sport Event Legacies *in* Journal of Sport Tourism · November 2007.

Preuss, H. (2015). A framework for identifying the legacies of a mega sport event. January 2015, Leisure Studies 34(6):1-22.

Ramshaw, G., Gammon, S.J. (2016). Towards a critical sport heritage: implications for sport tourism, Journal of Sport & Tourism.

Sternberg, R. J. Forsythe, G. Hedlund, J. Horvath, J. Wagner, R. Williams, W. Snook, S. Grigorenko, E. (2000) Practical intelligence in everyday life. Cambridge UPress.

Zyngier, S. Venkitachalam, K. (2011). Knowledge management governance-A strategic driver. Knowledge Management Research & Practice 9, 136-150.