

Running head: INNOVATION AND IDENTITY

Title: A social identity analysis of technological innovation in an action sport: judging elite half-pipe snowboarding.

Dr Jason Harding. Department of Tourism, Sport and Hotel Management, Gold Coast campus, Griffith University, QLD 4222, Australia +61 (7) 55555239. j.harding@griffith.edu.au

Dr Daniel Lock* Department of Sport and Physical Activity, Talbot Campus, Bournemouth University, Dorset, UK, BH12 5BB +44 (01202) 965528. lockd@bournemouth.ac.uk

Professor Kristine Toohey. Department of Tourism, Sport and Hotel Management, Gold Coast campus, Griffith University, QLD 4222, Australia +61 (7) 55529204. K.toohey@griffith.edu.au

Abstract

Research question: We explore how facets of the group identity shared by elite half-pipe snowboarding constituents (i.e., judges, athletes, and coaches) shape attitudes towards a proposed technological innovation to the existing judging process.

Research methods: Forty-nine Elite Half-Pipe Snowboarding (EHPS) constituents (Coaches, Athletes, and Judges) completed an open-ended questionnaire and email protocol. The sample included participants from 19 countries in Asia-Pacific, Europe, and North America; all of which participated, coached, or judged in Fédération Internationale de Ski (FIS) or Olympic EHPS competitions.

Results and discussion: Participants valued the freedom, individuality, and performance progression the current subjective judging protocol endorses. However, performance progression and changes to the half-pipe have created an increasingly difficult judging task. Participant attitudes toward the proposed innovation varied based on whether it was used to compute athlete final scores or to assist judges with their decision making. Positive attitudes stemmed from the technological innovation providing support to judges, while retaining the flexibility of the existing performance assessment process. Negative attitudes emerged due to perceptions the innovation would inhibit athlete freedom, creativity, and individuality.

Implications: Sport managers need to pay close attention to the identity shared by constituents prior to implementing innovation processes. Doing so provides a basis to apply new technological innovations in alignment with the values and beliefs of importance to constituents.

Keywords: Technological innovation, innovation management, social identity, action sport.

A social identity analysis of technological innovation in an action sport: judging elite half-pipe snowboarding.

Surfing, skateboarding, and snowboarding developed as counter-cultural pursuits in contrast to mainstream sport (Thorpe & Wheaton, 2011). Yet each of these 'sports' now boasts significant media exposure [and influence] and corporate involvement, which suggest a degree of commodification, commercialisation, and mainstreaming (Girginov, 2010; Rinehart, 2002). Explaining this contradiction, Thorpe and Wheaton (2011, p. 839) argued that "despite the rapid institutionalization, professionalism, and commercialization of action sports, many participants continue to privilege fun, friendship, and creative expression (e.g. style) over winning, ruthless individualism, and conformity". This contrast presents a series of challenges for managers of action sports in terms of balancing counter-cultural values with mainstream management practices (Chalip, 2010; Steen-Johnsen, 2008).

The particular sport management problem we address in this paper concerns the initiation (i.e., the point at which constituents first develop perceptions of a new object) of a new technology to supplement the existing judging protocol in Elite Half-Pipe Snowboarding (EHPS). Rinehart (2000, p. 509) revealed that action sport participants have a profound appetite for change and innovation. There is less understanding of how action sport participants respond to managers implementing innovation processes that affect them. Innovation processes are complex and can elicit resistance from participants when perceived negatively (Wolfe, 1995). For this reason, sport management researchers have endorsed inquiries that explore what underpins successful and unsuccessful innovation processes (Hoerber & Hoerber, 2012).

Innovation implies progression through the adoption of new practices, structures, or technologies (Wolfe, 1994). Yet, history provides a range of examples of technological

innovations which caused significant problems, such as diminishing the integrity, fairness, safety, or culture of a sport. For example, Fastkin swimming suits were not available to all competitors when released and broke FINA's rules (Craik, 2011; Magdalinski, 2000); PSV Eindhoven fans revolted after the installation of wireless internet in the Philips Stadion (The Guardian, 2014); and Major League Baseball banned aluminium bats as they put pitchers and fielders in physical danger (Wilmot, 2005). To avoid such issues, nuanced understanding of how an innovation might affect the culture, structure, and delivery of a specific sport provides a basis to avoid making similar mistakes.

In the present study we act on the suggestions of Mason (2002) and Wolfe (1994) who drew conceptual links between social identity and constituents' attitudes to innovations. Pioneering work in this area by Gwebu and Wang (2011) found that Open Source Software community members adopted technological innovations faster than rival groups to increase in-group status. We draw on the social identity approach (e.g., Hogg & Smith, 2007; Tajfel & Turner, 1979; Turner, 1985) to conceptualise how group membership shapes attitudes towards a technological innovation. Specifically, we explore constituent attitudes (i.e., judges, athletes and coaches) to a *proposed* technological innovation in EHPS (i.e., it is not currently used) that calculates each athlete's airtime and rotation (Harding & James, 2010).

Theoretical framework

Innovation refers to the introduction of new objects, technologies, or ideas that, in theory, instigate progression and change (Zaltman et al., 1973). Damanpour (1987) outlined three forms of innovation: technological, administrative, and ancillary. Each form influences organisational life in different ways and leads to varying managerial challenges. Technological innovations

include inventions in the ‘industrial arts, engineering, applied sciences and/or pure science’ (Garcia & Calantone, 2002, p. 112), which result in a ‘new tool, technique, device or system’ that enhances organisational capability (Damanpour, 1987, p. 677). Administrative innovations involve shifting resource allocations, task structures, or other managerial functions to achieve greater efficiency or effectiveness over time. Ancillary innovations refer to new tasks completed outside of the internal organisation. In this paper, we refer to the application of a wearable gyroscope and accelerometer device as a *technological innovation* from hereon.

Zaltman, Duncan and Holbek (1973) posited that innovation processes consist of two stages: initiation and implementation. The *initiation* stage occurs prior to the introduction of a new device. It is the point at which constituents develop *awareness* of the innovation prior to evaluating its *compatibility* with the organisational activity to which it relates. Initiation provides managers with an opportunity to develop understanding of potential issues with a new technology in order to determine issues that may occur during, or after, implementation. The *implementation* stage occurs when a new object, technology, or idea is introduced into organisational activities (Damanpour, 1987). Successful innovation management, therefore, starts before a device is implemented and operates to diffuse potential issues that might be encountered following its introduction.

Technological innovation in social context

Wolfe (1995) explored the personal, social, organisational, and environmental concerns that make innovation management complex. He suggested that three factors influence a constituent’s receptivity to an innovation: (1) radicalness, (2) magnitude, and (3) pervasiveness. Radicalness refers to the perceived novelty of a technological device in relation to the status quo. Magnitude relates to the amount of change a technological innovation implies for constituents,

structural arrangements, and organisational finances. Pervasiveness refers to the proportion of people in a community that are affected by the adoption of an innovation. When the perceived radicalness, magnitude, and pervasiveness of an innovation is minimal, constituents are more likely to be receptive to its introduction. Thus, managers of innovation processes require a tacit understanding of why constituents develop positive or negative attitudes to new devices in order to mitigate against resistance. While constituent perceptions do not necessarily correlate with the objective merit of an innovation (Wolfe, Wright, & Smart, 2006); they provide a crucial insight into potential issues that may emerge at the point of implementation.

In previous research, Caza (2000) explored how the unique details of a technological innovation interact with the social context of a sport to influence constituents' receptivity. In boxing, he explored the introduction of an athlete ranking system (accepted) and a computerized scoring system (rejected), which had previously been used in other sports. He demonstrated that the unique details of a specific technological innovation can be appropriate to the social and cultural context of some sports, but not others. A legitimate innovation in one sport may violate values or ideals that are important to many constituents in another sport (e.g., the installation of WIFI in the Phillips Stadion). To avoid implementing unsuitable innovations, Meyer and Goes (1988), and Caza (2000) endorsed research that explores how constituents perceive an innovation, prior to its implementation (i.e., at the point of initiation).

Wolfe (1994) and Mason (2002) argued that the social identity shared by a sport's constituents may provide additional insights into why people accept or resist technological innovations. We use the social identity approach as a basis to explain how group membership influence attitudes towards new objects such as innovations (Hogg & Smith, 2007; Tajfel & Turner, 1979).

Social identity and innovation

The social identity approach combines social identity theory (Tajfel & Turner, 1979) and self-categorization theory (Turner, 1985) to frame processes of behaviour within (in-group) and between groups (intergroup). Tajfel (1974) developed social identity theory to explain intergroup conflict. He advanced a framework demonstrating how processes of intergroup status led to an array of behaviours towards out-groups. Self-categorization theory developed on social identity theory, explicating a social-cognitive basis for in-group behaviour. Specifically, the process of choosing to categorize oneself as similar to other individuals on some characteristic (e.g., snowboarder) provides a psychological basis for group identification and in-group behaviour. Both theories developed from research on intergroup behaviour and conflict; however, the insights provided have been applied in a variety of disciplines such as management (e.g., Ashforth & Mael, 1989), marketing (e.g., Bhattacharya, 1995), and innovation (Gwebu & Wang, 2011).

Group reflects that part of a person's self-concept that derives from his or her cognition of belonging to a group in social situations (cf. Tajfel, 1982). While a group identity might be complex and involve a plethora of shared values (see Thorpe & Wheaton, 2011), it might involve merely sharing the same category membership. The psychological sense of belonging to a group creates, to varying extents, a set of collective interests and in-group norms for participants (Turner & Reynolds, 2008). Hogg and Smith (2007) explicate how convergence around group norms, in relevant social contexts, and in relation to different out-groups, leads to the formation of attitudes that reflect group consensus on certain issues. Therefore, the social identity approach provides a detailed insight into the role of in-group values and comparisons with other groups (i.e., out-groups) on attitudes to technological innovations.

Although well established in a plethora of disciplines, researchers exploring action sports typically eschew social-psychological approaches in favour of poststructuralist, cultural studies, or sociological theories (e.g., Heino, 2000; Humphreys, 1997; Thorpe, 2004, 2005; Thorpe & Wheaton, 2011). This reflects the nature of the issues explored in relation to action sports. In existing literature, action sport researchers explore, for example, gender dynamics (Thorpe, 2005, 2010), status (Thorpe, 2004), lifestyles and tastes (Thorpe, 2012), and resistance to mainstream ideals (Heino, 2000; Humphreys, 1997). While theoretically different to our approach, these studies provide critical insights into identity in action sports. Noting the presence of in-group status and intergroup distinctiveness, Wheaton (2007, p. 300) stated ‘for those who self-identify as participants, there is also a high level of stability and distinctiveness in the culture’s sense of collective identity and forms of status’. We review two strands of existing research on action sports: (1) demonstrating status and, (2) resistance of mainstream culture.

First, poststructural and cultural studies researchers have contributed greatly to understanding of how action sports participants obtain status through behaviour. Action sports participants achieve status as insiders through authentic behaviour; the embodiment of which changes and fluxes based on the social context (Donnelly, 1981; Thorpe, 2004, 2005; Wheaton, 2000). Authenticity derives from the clothes a person wears (Thorpe, 2004), the language he or she uses, or the activities he or she undertakes in the subculture (Wheaton, 2000). Such behaviours allow participants to obtain cultural capital in relation to outsiders that demonstrate a lesser understanding of norms and conventions. Outsiders, are individuals or organisations that exist on the periphery or outside the boundaries of a subculture (Wheaton & Beal, 2003). Therefore, existing research on action sports demonstrates that behaving in alignment with social and cultural norms provides a source of status for participants. It also provides us with a basis to

place the judges, athletes, and coaches we investigate as a group of insiders due to their occupation of a core role in the delivery of EHPS.

Second, existing research provides rich qualitative insights exploring the development of a snowboarding subculture. Thorpe (2005, pp. 76–77) expresses how snowboarding ‘offered “alternative youth” space to cooperate, express individuality and play in an environment that ran *counter* to the *controlled, competitive* and *rule-bound* [emphasis added] system of mainstream sports.’ Opposition to control, competition and rules has led researchers to explore the importance of values including individualism (Thorpe, 2004), anti-competition (Humphreys, 1997), and an artistic focus, which formed in contrast to sport (Thorpe, 2005). From a social identity perspective, each of these findings demonstrates the role that intergroup processes have played in the construction of a distinctive snowboarding identity. Furthermore, it provides insight into the values of individualism, anti-competition, and art, which have provided distinctiveness in contrast to other groups (e.g., skiers). These values emerge quite consistently in literature on snowboarding; however, there is a lack of research that specifically explores EHPS. As such the extent that these values apply to EHPS is unclear, given the high-level media exposure and commodification the activity has undergone since the late 90s (Girginov, 2010; Thorpe & Wheaton, 2011).

The existing poststructural and cultural studies research provides rich insights into identity in relation to action sports generally and snowboarding specifically. However, Wheaton (2007) noted a gap in understanding of how action sport participants resisted or opposed other cultures and groups. The social identity approach (Tajfel & Turner, 1979; Turner, 1985) provides a robust social-psychological basis to explore how identification with EHPS influences intra and intergroup processes that inform attitudes to technological innovations (cf. Hogg & Smith,

2007). It also informs a managerial approach to innovation based on tacit understanding how group identification shapes the specific details of a technological innovation that constituents resist. To frame the present inquiry, we explore two research questions.

RQ1: How do EHPS constituents evaluate the *existing judging protocol*?

RQ2: How does the social identity shared by EHPS constituents shape attitudes to the *proposed technological innovation*?

Study context

Girginov (2010) and Thorpe and Wheaton (2011) both argue that snowboarding has become institutionalised and homogenised into global sporting culture since featuring in the X Games and Olympic Games. In 2014, the Sochi Winter Olympics included five snowboarding disciplines: Snowboard Cross, Half-Pipe (EHPS), Slopestyle, Parallel Slalom, and Giant Slalom. In this study, we focus on EHPS, which retains a counter-cultural appearance at the elite level through athlete attire (e.g., baggy clothing), self-selected music during runs, and a focus on individuality and creativity (Thorpe & Wheaton, 2011). While embodying aspects of alternative culture, EHPS also garners significant media attention and performance scrutiny as a result of an ongoing process of sportification (cf. Pfister, 2007).

Judging EHPS. EHPS first appeared in the 1997 Winter X Games at Big Bear Lake. It debuted in the Winter Olympics in Nagano 1998. The International Olympic Committee (IOC) targeted snowboarding following a reduction in consumer interest among young people. Therefore, the inclusion of EHPS in Nagano was an attempt to engage with the large market of action sport consumers under the age of 25 (Thorpe & Wheaton, 2011). When introduced to the Olympic Games, the Fédération Internationale de Ski (FIS) were recognised as the official governing agency, which caused significant backlash from the International Snowboard

Federation (ISF) and some athletes. Following this backlash, the ISF and some athletes rejected any association with the FIS and mainstream Olympic sport culture.

The objective for EHPS competitors in 1997, as now, is to perform well-executed routines consisting of complex aerial acrobatics completed as high above the half-pipe lip as possible. A competition half-pipe is 160-200m in length, 18m wide, with wall transitions of 7 - 8m (22ft) and 18 degrees of inclination (See Figure 1 for a visual example).

-----Insert Figure 1 about here-----

EHPS competitions allow athletes to display individuality and freedom (FIS, 2013). Currently, EHPS judging uses a subjective measure of overall impression (OI), which evaluates: trick amplitude and airtime, degree of rotation, difficulty, style and execution, sequence and combination of manoeuvres, amount of risk in the routine, use of the half-pipe (including the line taken), and how a run progresses and flows (FIS, 2013). In FIS competitions, three to six judges score each performance. At the Winter Olympic Games, five judges generate a total score, which is calculated and averaged to a score out of 100. The inclusion of EHPS in the X Games and Winter Olympics has exposed snowboarding athletes to sportification processes such as control, performance enhancement, and media scrutiny. In turn, this has increased pressure on the integrity and accuracy of competition results (e.g., Collins, 2010). Despite drastic progressions in athlete performance, the EHPS subjective judging protocol has not changed since Nagano.

Typically, subjective judging receives criticism for its openness to manipulation, corruption or bias (Zitzewitz, 2006). However, in EHPS, criticism focuses on the judge's failure to recognise and reward the complexity of new and difficult tricks. Karp (2009) contended that the existing EHPS judging process misses new tricks due to continual advancements in athlete performance. To remedy this concern, sport engineers have developed wearable accelerometer

and gyroscope sensors that measure two of the eight aspects of EHPS performance (i.e., airtime and rotation; Harding & James, 2010). While noting Rinehart's (2000) argument that some alternative sport participants relish new technologies and change, we explore how facets of the social identity shared by EHPS judges, athletes, and coaches, shape attitudes towards the quantification and further sportification of athlete performance. We outline the method we used to explore this problem, next.

Method

We used cross-sectional in-depth qualitative data to explore constituent evaluations of the existing judging protocol (RQ1) and proposed innovation (RQ2). We used email correspondence and an online survey platform to collect the data.

Participants and procedure

Respondents were selected using a purposive sampling method ($N = 49$). The lead researcher made contact with a series of gatekeepers in the EHPS community through which elite judges, coaches, and athletes were targeted for recruitment as a cohort of information rich (Punch, 2013), topic experts (Gubrium & Holstein, 2002). We provide the questions used in Appendix 1. Judges were contacted by approaching the IOC, who sent an email to all FIS registered competition judges and one reminder seven days later. A total of 17 judges responded to the lead researcher following the FIS email. Following responses, the lead researcher sent an email questionnaire to judges with an information sheet on the ethics of the research. Due to the inclusion of additional questions, which did not inform this study, we administered the same qualitative questionnaire to coaches and athletes using Qualtrics online survey software. Coaches ($n = 20$) and athletes ($n = 12$) were sent a hyperlink to the instrument from the FIS database. We sent one reminder email after seven days to all respondents to increase participant numbers.

Respondents were male, with the exception of two female participants. At the 2010 Winter Olympic Games (we conducted this study in 2011), all eight judges were male, 46 of 48 judges were male, and 40 of 70 athletes were men. This demonstrates an over-representation of males in the EHPS community, which is reflected in our sample. However, the lack of female athletes in our sample is a study limitation.

All participants spoke English. In compliance with Australian human research ethics guidelines we do not use the names, ages, gender, nationalities, or job title of participants. We cannot provide nationality or role as in the case of judges, this would violate participant confidentiality. We identify respondents by their role (e.g., Judge, Coach and then numerically i.e., Judge 1, 2, 3.... n or Coach 1, 2, 3.... n). Eight participants came from the Asia-Pacific region, 27 from Europe, and eight from North America. In total, our sample included EHPS constituents from 19 different countries. The email and online survey techniques included open-ended questions that respondents could access on multiple occasions in between international travel and competition commitments.

Data Analysis

We downloaded the data into Microsoft Excel. Then the research team engaged in a process of collaborative coding. The three members of the research team met to discuss the coding process. Following this meeting, all three members of the research team independently conducted a process of open coding (Miles & Huberman, 1994). In a preliminary process of open coding we compared each participant's responses based on whether they completed the instrument (a) via email or (b) online survey. We used this approach to establish if the data exhibited methodological biases. The open codes that emerged from both types of survey during this process were consistent. Next, we explored the data for differences based on each

participant's role (coach, judge, or athlete) in the EHPS community. The role related differences occurred in one theme: task complexity. We discuss the differences within two sub-themes of task complexity: sight and recording, and assessing individuality.

We used a mid-range (blending deductive and inductive coding) coding process to explore the data (Denis, Lamothe, & Langley, 2001; Miles & Huberman, 1994). This coding framework allowed us to analyse the data based on the social identity approach, while allowing the words, thoughts and feelings of participants to elaborate new understanding of attitudes toward technological innovations. We examined the data to:

1. Explore participant evaluations of the current judging process to decipher any strengths and weaknesses of the existing method (RQ1)
2. Find references to important values and undesirable out-groups that provided a frame of reference for attitudes to the technological innovation (cf. Hogg & Smith, 2007)
3. Elicit factors that increased the perceived radicalness, magnitude and pervasiveness of the technological innovation (RQ2) (Wolfe, 1995).

We continued to meet and negotiate our open codes to establish inter-coder reliability. We then placed the open codes into over-arching themes (Creswell, 1998; Miles & Huberman, 1994) and more specific sub-themes. We selected titles for themes and sub-themes, which drew on language used by participants to describe their experiences and evaluations of the study content (Denzin & Lincoln, 2000).

Results and discussion

We present the results and discussion in response to our two research questions. First, we present participant perceptions of the existing judging protocol as a basis to understand the status

quo. Through the collaborative coding process, we identified two sub-themes of relevance to RQ1: *Judging snowboarders* and *task complexity*. In response to RQ2, constituents described how different applications of the technology led to positive or negative attitudes. Our coding of the data in relation to the innovation led to the creation of three themes: (1) *Interpreting application*, which informed perceptions of (2) *reduced freedom* or (3) *freer judges*.

Research question one

RQ1: How do EHPS constituents evaluate the *existing judging protocol*?

Our first theme: **judging snowboarders** included two sub-themes: *endorsing freedom* and *performance progression*. Participants described how they valued freedom, art, expression, individuality, and enjoyment as elements of snowboarding (Heino, 2000; Humphreys, 1997; Thorpe & Wheaton, 2011; Thorpe, 2004). This provided insight into the similarities between snowboarding culture broadly, and the identity of EHPS specifically. Moreover, participants explained how the existing judging protocol encourages athletes to embody values more broadly associated with the snowboarding subculture. Coach 18 explained:

“It lets the athletes’ show who they are and what they can do freely. They can show basically their personal being in their style and who you are as a snowboarder and you can go at it and you can invent new tricks and you can invent new grabs, go big, go small, spin as fast you want. So the system lets you do that.”

The first sub-theme explores participant perceptions that the existing judging protocol *endorses freedom*.

Endorsing freedom. Revealing the importance of freedom and individuality to snowboarders (Heino, 2000; Humphreys, 1997), EHPS constituents felt the subjectivity of the existing judging protocol encouraged athletes to ride without restrictions. Highlighting this point, the FIS judging manual describes freedom and individuality as key components of EHPS

performance (FIS, 2013). Coach 19 and Judge 17 described how the flexibility in existing judging methods encouraged athletes to display individuality

“The criteria is [sic] basically like, have [a go] at it. You can show off your skills, you can show off your ability and show off your flair as a snowboarder, which is what snowboarding is about. There is an element of flair in there and there is an element of personal style (like surfing)” (Coach 19)

“Of course in snowboarding a jump can be labelled ‘perfect’ or ‘perfectly executed’; however the style of execution of the exact same trick can differ from one athlete to another. I especially think that most snowboarders really want to stay free and agree that style must be a part of riding and a good style should get better points than a shitty style” (Judge 17)

Previous research illustrates how snowboarding emerged as a youthful, middle-class activity in contrast to the rule-bound sport of skiing (Heino, 2000; Humphreys, 1997; Thorpe, 2004). Six EHPS participants, however, referred to alternative outgroups that enforce strict performance criteria on athletes. The following comments described intergroup comparisons with other activities:

“It’s an artistic expression basically; you look at gymnastics or whatever, you definitely have some kind of artistic form to it... Because [sic. In snowboarding] the tricks are left to your own impression. With gymnastics there’s only one way of doing a front flip so I’ve just learnt apparently! You gotta put the arms in the air! That’s gymnastics for you” (Athlete 8)

“The level of execution is different as well as style, grabs and amplitude. To me, this is one of the biggest advantages of our current judging system and also one that separates snowboarding from *other sports* [emphasis added]” (Judge 13)

Six participants described their own perceptions and criticisms of the more rigid judging criteria used in other sports when discussing the strengths of the EHPS judging process (*Gymnastics*, mentioned by Judge 7, Coach 10, Coach 16, and Athlete 3; *Ballet*, Coach 20; and *Figure skating*, Coach 17). Participants explained a negative perception of these sports due to the tendency for athletes to perform physical movements based on predetermined criteria. The

flexibility in the EHPS judging protocol eschewed predetermined performance criteria in favour of athlete individuality.

Performance progression. In addition to a perception that the judging process endorsed freedom, constituents described how athletes constantly sought to achieve new standards, which we coded to the sub-theme: performance progression. The effects of an increasing sportification of EHPS was evident in narratives which explained how athletes push performance boundaries (e.g., Pfister, 2007). The EHPS judging criteria states: ‘by rewarding progression we help to push the sport forward’ (FIS, 2013, p. 123). Judge 2 linked the rules specified by the FIS with the broader snowboarding values of creativity and progression. He explained ‘I think that snowboarders in general are creative people that like to explore and try new things.’

Participants described how EHPS athletes collaborated to develop new tricks, similar to the comradeship revealed in studies of the snowboarding subculture (Humphreys, 1997; Thorpe, 2005). Coach 15 explained: ‘if someone is throwing down [sic] on a jump in the pipe or on a rail, others just want to be around that positive energy. And from there the energy builds until everyone is pushing their skills.’ Judge 8 explained how athletes interact to progress tricks: ‘somebody comes up with a new trick; everybody will try to learn it and make better variations of it in a period of rapid progression. We have just gone through a period like that with double corked [sic] spins.’ Other participant narratives explained how trick innovation starts with one person, but then expands to a collaborative effort between athletes who work to recreate, diversify, and improve its performance.

Task complexity. While the development of new tricks harnesses individuality, creativity, and collaboration, such performance improvements make judging EHPS process

increasingly complex. The task complexity theme includes three sub-themes: *sight and recording*, *assessing individuality*, and *coping with complexity*.

Sight and recording. In this sub-theme judges provided the majority of responses, based on a higher level of experience of assessing athlete performance. Since EHPS was introduced into the X Games and Winter Olympic Games, athletes have benefitted from developments in ramps and boards (longer ramps (Judge 12)), different kickers on the ramp edges (Judge 1) and evolutions in technology (e.g., rocker boards (Judge 5)). Each innovation has enhanced athletes' capacity to perform new and creative tricks while, at the same time, making the task of judging EHPS harder. Athletes can now ride faster, go higher during tricks, and achieve levels of performance not previously attainable. Judge 1 explained: 'We have a hard job down there, like with writing down everything, recognising it well, execution, amplitude, you are working, actually your brain is working in a multiple. It's working on five levels in the same moment and actually us humans are not made for this.' Coach 19 elaborated:

"To sit there at the bottom of the pipe and what they currently do is watch the first air and then they put their head down and write something and then they look back up. So in the two or two and a half seconds it takes you to get from wall to wall or lip to lip they are missing something every time. You can miss things. And to watch those 6 hits or 8 hits [whilst judging] is extremely hard to do. You have to be on it the whole time. So listen I will be perfectly honest. Those guys get it wrong. From week to week they get it wrong."

The quotes from Judge 1 and Coach 19 illustrate that, currently, judges need to focus on watching an athlete's run, while also recording scores on a memory board. As such, judges alternate between two separate tasks, which some participants felt created issues with providing accurate scoring. When recording scores, judges can miss aspects of an athlete's performance, which can cause issues with scoring accuracy.

Judge 4 described how innovations in ramp length might impact judging accuracy: 'I think the biggest problem could be as pipes get longer it would be harder for us to see the tricks

performed in the beginning of it.’ Judge 12 had already experimented with the use of binoculars to cope with this issue:

“Now the half-pipes are getting longer and judges have problems to see what is going on 200m away. I started to play around with binoculars last year for the first two ‘hits’. This worked very good [sic]. But then the problem is to write the tricks down in our memory board [judges record scores on a memory board].”

Next we explore the contrast between the endorsement of freedom and style, and the complexities of assessing individuality.

Assessing individuality. Freedom to perform tricks with individuality and style allowed athletes to ride as snowboarders while pushing performance boundaries. Judges did not discuss or refer to problems with assessing individuality, which reflects their role as current assessors of athlete performances. Athletes and Coaches provided the only narratives that we coded to this sub-theme, which primarily contained criticisms of the existing judging process. Assessing athlete performance without structured guidelines on trick performance was problematic from Athlete 1’s perspective as it created ‘different opinions on style.’ This aligned with Athlete 8’s perception that judges relied on personal taste when allocating scores:

“Everyone has a different opinion on judging and everyone has a different opinion on what’s good and what should be rewarded. Sometimes I agree with it, sometimes I don’t agree with it.... The weaknesses is humans! [sic] One person thinks he’s good, the next person doesn’t think he’s good...it’s so subjective.... any judged sport is a subjective thing; that’s the biggest weakness, it’s all about taste” (Athlete 8)

Participant narratives also revealed a perception that the difficulties with judging EHPS had already forced change, which we discuss within the next sub-theme: *coping with complexity*.

Coping with complexity. Despite participants feeling that the existing judging protocol endorsed freedom and allowed for progression, the complexities associated with subjectively assessing EHPS performance had already influenced how judges communicated results to athletes and coaches. Coach 20 explained:

“When you talk to the judges they’ll never talk to you about style, they’ll go to execution; was it executed properly. If a judge said ‘he had way more style on that’ well that’s opening a massive can of worms for people to come back and say ‘what’s your perception of style?’”

Consequently, judges assess run execution (which combines: variety, pipe use, progression, risk taking, combination of tricks and consideration; FIS, 2013), airtime, and rotation instead of style.

Judge 9 and Athlete 2 argued that this has influenced EHPS in a negative way

“It has become a discipline where athletes are forced to adhere to a structured format and self-expression or ‘style’ is lost. We as judges cannot judge ‘style’ as we all have varying opinions. Therefore, a strict set of criteria has to be adopted. This ultimately hinders the progression of the sport” (Judge 9).

“I feel like the sport is out of control and way less appealing to watch due to the lack of style and variation....double double double double fuck this sucks [sic]. I feel as though it is all just for the crowd now. General viewers are growing but those who are involved in the sport are avoiding it” (Athlete 2).

Without the introduction of the proposed technological innovation we explore, there are perceptions that the increasingly complex task EHPS judges face has already subtly shifted performance assessment towards more concrete measures than style.

Research question two

RQ2: How does the social identity shared by EHPS constituents shape evaluations of the *proposed technological innovation*?

To explore our second research question, we presented participants with three questions concerning whether they were aware of a device to measure athlete airtime and rotation, and to canvass their attitudes towards its application in EHPS. Kessler and Chakrabarti (1996) suggested it is difficult to achieve consensus in terms of constituent receptivity to an innovation. Endorsing this perspective, participant narratives revealed mixed attitudes to the objective measurement of airtime and rotation in EHPS, which, in turn, related closely to the strengths and weaknesses of the existing judging protocol. Constituent attitudes were based on concerns about

how managers and competition administrators would implement the technology (i.e., the sub-theme of *interpreting application*). If participants felt that the new device would calculate an athlete's final score it aligned with negative attitudes due to a perception it would *reduce freedom* (the second sub-theme). Not one participant supported the use of the technological innovation as the sole determinant of an athlete's final score. However, as an aid to judges, a majority of participants felt it had merit if it could *free judges* (the third sub-theme) and make the judging task less complex.

Interpreting application. *Interpreting application* extended Caza's (2000) observation that the unique details of a technological innovation can influence constituent receptivity. As Collins and Evans (2012) argued, technological innovations can be used well or poorly. Constituents that displayed positive attitudes towards the potential technological innovation felt that the device could assist, rather than replace judges. Athlete 8 summarised this phenomenon

“Completely all electronic scoring would be perceived very badly by the community, partial electronic scoring would be perceived with mixed feelings.... the snowboarding community is pretty open minded and ready for new things...and you know, I think it would take one element out the complaints...the subjectiveness (Athlete 8).”

Athlete 8's explained how he felt constituent attitudes towards the technological innovation might change, based on how the device was implemented in EHPS. In the next section, we explore perceptions that using the technological innovation to generate final scores would *reduce freedom*.

Reduced freedom. Participants with negative attitudes to the proposed innovation, perceived that the introduction of technological measurement jeopardised shared values of creativity, freedom and individuality (cf. Hogg & Smith, 2007; Tajfel & Turner, 1979). The threat to creativity and individuality led to perceptions that the proposed innovation would create

a radical change from the status quo (Wolfe et al., 2006; Wolfe, 1995). Coach 1 stated, 'I believe this has no place in judging', while Coach 19 explained that

"You start narrowing the sport and the freedom of the sport and that's the disadvantage. Once you take that spice and energy and freedom to do what you want and bone out your tricks and not bone out your tricks and not look stylish or look stylish, when you take that out the equation you kinda lose snowboarding."

The threat to athlete freedom and individuality showed a clear link between group membership and attitudes to the influence of introducing the new device. Athlete 3 described how objective measurement of airtime and rotation pushed 'the sport into a direction that no one wants it to be. The reason people starting snowboarding was the enjoyment and freedom of riding down a mountain and to analyse every rotation and amplitude takes all that away from the sport.' Athlete 11 explained the importance of human judgement 'you can't do it. That's one element in judging and it'd be a good element to have, but a computer can't judge style, it can't judge edge control'. By objectively measuring airtime and rotation, Athletes 3 and 11 perceived a threat to the freedom and style they associated with being a snowboarder (Heino, 2000; Humphreys, 1997).

In addition to threatening important values, negative attitudes also emerged when participants felt that the technological innovation would lead to the emulation of the practices of an undesirable out-group. Judge 7 and Coach 20 discussed this fear

"I am sorry, but I think this is not the correct way for judging snowboard events. This is snowboarding, not gymnastics. In our scores a lot of parameters [contribute to OI], not only airtime and degree of rotations. This will be the death of half-pipe snowboarding" (Judge 7)

"We don't wanna be ballerinas, we wanna be snowboarders. Of course you can score off that and you've got a measurement and that can be scored. Whether it's right for our sport or not, I don't think so, cos we'll be getting cats who'll be doing ballerina things" (Coach 20)

Thorpe and Wheaton (2011) argued that some athletes perceived the inclusion of snowboarding disciplines in the Olympic Games as a threat to the anti-authoritarian and free origins of the sport. Here, participants feared that a technological innovation might lead to the same outcome in EHPS.

Freer judges. Participants describing positive attitudes and receptivity to the technological innovation felt that the device might reduce some of the issues with task complexity for judges. In turn, this would provide greater flexibility for judges to focus on creativity, style, and individuality during athlete performance. Participant receptivity was conditional upon the device being used by judges only to measure athletes' airtime and rotation. Athlete 2 felt that objectivity would 'bring a better understanding to the coaches and the athletes by adding facts (height, rotation) to support the judges' reasoning for the scores they gave so scores are not solely represented from first impressions.' Athlete 8 stated: 'Don't get rid of the humans cos [sic] then the whole style of it gets taken out of there'. Thus, receptivity to the proposed device required that judging would still involve human adjudication of performance.

Participants in favour of the innovation felt that objective measurement of airtime, particularly, would allow judges to concentrate on other aspects of performance (flow, execution etc.). Specifically, it would reduce the need for judges to record information on a memory board during an athlete's run. Coach 11 suggested that:

"Personally I think it is a judge's job to be able to define how much an athlete rotates. It's not that hard to see the difference from a 1080 and a 1260 for example and usually the judges don't do mistakes concerning these things. To have precise height and air time measurement could be very useful though, because it would make it easier for the judges to put focus on execution technical nature instead, plus the fact that it would make it more obvious to both athletes, coaches and the rest of the people watching" (Coach 11)

"Of course, when we find a way, how to use them effectively and in accordance with execution and other judging criteria. Quantitative data have always more confidence than qualitative analysis of human movement made by judges. I think that most judges' brain

capacity goes to identify the trick, not to execution so this objective information might help” (Judge 5)

Twenty two participants’ described positive attitudes toward the new device when it was perceived as a tool to simplify the judging task in EHPS. These participants felt that the innovation could enhance each judge’s capacity to observe and assess the stylistic aspects and address the current EHPS issues caused by the judging complexity. In turn, this emphasised athlete individuality and creativity, while protecting against conformity.

Conclusion

We have extended existing work on technological innovation by exploring the conceptual link between social identity and attitudes towards a new device in EHPS (Meyer & Goes, 1988; Zaltman et al., 1973). To conclude the manuscript we outline our theoretical contribution, before specifying implications for the management of technological innovation in action sports.

Theoretical implications

While Mason (2002) and Wolfe (1994) linked social identity with attitudes to technological innovation, we have specifically explored the relationship. By analysing the initiation of a technological innovation process using the social identity approach, we have contributed to theory in two ways. First, we found that shared values (freedom, individuality, and creativity; cf. Heino, 2000; Humphreys, 1997; Thorpe, 2004; Thorpe & Wheaton, 2011) – provided powerful reference frames underpinning constituent attitudes toward the introduction of a device to measure athlete airtime and rotation in EHPS. Furthermore, constituents also used out-groups such as gymnastics, figure skating, and ballet as a frame of reference for negative attitudes to the innovation. The choice of these out-groups was interesting, considering that ski jumping, twin tip, and freestyle skiing (i.e., traditional snowboarding out-groups) use similar

judging processes. Our first theoretical contribution, therefore, illustrates that constituents will develop negative attitudes to a technological innovation to the extent that it is perceived to (a) diminish values that are shared by constituents (i.e., group identity); and/or (b) emulate practices and processes used by undesirable out-groups.

Second, we extended the work of Caza (2000). He discussed how the application of a computerized scoring system, which had worked in other sports, failed in boxing. However, the manner in which the unique details of a technological innovation are implemented plays an important role in the formation of positive or negative attitudes and, thus, constituent receptivity. We found that there are a variety of ways to incorporate the measurement of airtime and rotation into the judging process of EHPS (i.e., unique details of the technological innovation). The specific details of the innovation we investigated could have been used to generate athletes' final scores; partially generate athlete scores; or to support judges in their decision-making without directly contributing to final scores. As we have demonstrated, each application of the technology shifted constituent attitudes and receptivity to the implementation of the device. Therefore, our second theoretical contribution illustrates that constituent attitudes toward the unique details of a technological innovation can vary based on how it is implemented in a sport.

Managerial implications

Two managerial implications emerged from this study. First, the objective measurement of airtime and rotation in EHPS presents an opportunity to simplify an increasingly complex EHPS judging task. If used as a support mechanism for judges, the measurement device could enhance each judge's capacity to recognise new and complex tricks, while also enhancing competition fairness (Collins, 2012). This recommendation also applies to other action sports, which are judged similarly to EHPS (i.e., surfing, skate sports etc.). To develop understanding of

how the unique details of a technological innovation might influence a sport, managers should ask the following questions (1, 2, 3, 4 & 5). We use the findings from the present study to provide contextual responses to each question (a, b, c, d & e).

(1) What aspects of the status quo does this proposed technological innovation influence?

a. The existing subjective judging protocol

(2) Which aspects of the existing approach are most valued by constituents?

b. Freedom, individuality, and creativity

(3) Do undesirable out-groups provide a context for attitudes to the technological innovation?

c. Yes. Gymnastics, figure skating, and ballet

(4) What concerns do constituents perceive in relation to the technological innovation?

d. Predetermination of ideal performance leads to athlete conformity

(5) How should the unique details be implemented to enhance alignment with a sport's core values and identity?

e. Use device to support judges and simplify task. Retain focus on individuality, freedom, and progression alongside measurement of airtime and rotation.

Second, when constituents are empowered as members of the initiation stages of technological innovation processes they can provide crucial insight into the potential harm and benefits of an innovation. Empowering participants to contribute to the innovation process allows sport managers to generate greater understanding of (a) existing strengths, (b) current deficiencies, (c) intended and unintended uses and applications of a device, and (d) how to frame an implementation process so that it does not impinge on values constituents' share. It should also inform communication strategies in relation to the beneficial contribution of any new

device. Listening to these concerns and acting on them, can prevent future technological innovations in sports becoming the next Fastskin, unwanted WIFI installation or aluminium bat.

Limitations and future research

Our results provide new insights into the relationship between social identity and constituent attitudes toward a technological innovation. However, we acknowledge five limitations to this study. First, we presented a case study of one discipline of a specific action sport. While this provided an opportune context to explore identity dynamics in relation to innovation, the results of this study require additional investigation to determine transferability (Miles & Huberman, 1994). Second, we looked at judges, athletes and coaches in EHPS due to their intimate knowledge of existing judging protocols. Other members of the snowboarding community were beyond the scope of this research. Future projects should explore how spectators, recreational participants and sponsors (including the media) perceive the introduction of technological innovations in action sports. Third, we explored the attitudes and perceptions of a group of constituents to a proposed change, not an actual one. Therefore, future work, particularly action research, is required to explore how innovation processes unfold from the initiation to implementation stages. In this approach, researchers and those affected by the technological implementation would actively participate in its development and introduction. This would provide a much deeper insight into the challenges that sport managers face from the initiation of a technological innovation to its implementation. Fourth, our sample included a strong bias towards male participants, which stemmed from the lead researcher's experiences in the EHPS community. As such, our gatekeepers retained access, mainly, to elite male half-pipe snowboarding competitions. Future work should probe the experiences of a more gender

representative group of constituents. Finally, our sample contained a low proportion of elite athletes, which we acknowledge as a weakness of the study. We found this group less willing to participate in our study. To overcome this limitation we suggest that in the future researchers arrange to interview elite athletes face to face, possibly after events, when the athletes have some leisure time. To further facilitate access to this group, gaining the support of their coaches could also act as an incentive for athletes' participation.

References

- Ashforth, B., & Mael, F. (1989). Social identity theory and the organization. *Academy of Management Review*, *14*, 20–39.
- Bhattacharya, C., Rao, H., & Glynn, M. (1995). Understanding the bond of identification: An investigation of its correlates among art museum members. *The Journal of Marketing*, *59*, 46–57.
- Caza, A. (2000). Context receptivity: Innovation in an amateur sport organization. *Journal of Sport Management*, *14*, 227–242.
- Chalip, L. (2010). Toward a distinctive sport management discipline. *Journal of Sport Management*, *20*, 1–21.
- Collins, H. (2010). The philosophy of umpiring and the introduction of decision-aid technology. *Journal of the Philosophy of Sport*, *37*, 135–146.
- Collins, H., & Evans, R. (2012). Sport-decision aids and the ‘CSI-effect’: Why cricket uses Hawk-Eye well and tennis uses it badly. *Public Understanding of Science*, *21*, 904–921.
- Craik, J. (2011). The Fastskin Revolution: From Human Fish to Swimming Androids. *Culture Unbound*, *3*, 71–82.
- Creswell, J. (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. London: Sage Publications.
- Damanpour, F. (1987). The adoption of technological, administrative, and ancillary innovations: Impact of organizational factors. *Journal of Management*, *13*, 675–688.
- Denis, J., Lamothe, L., & Langley, A. (2001). The dynamics of collective leadership and strategic change in pluralistic organizations. *Academy of Management Journal*, *44*, 809–837.

- Denzin, N., & Lincoln, Y. (2000). Introduction: The discipline and practice of qualitative research. In N. Denzin & Y. Lincoln (Eds.), *Handbook of qualitative research* (Vol. 2, pp. 1–28).
- Donnelly, P. (1981). Toward a definition of sport subcultures. In M. Hart & S. Birrell (Eds.), *Sport in the sociocultural process* (Vol. 3, pp. 565–587). Dubuque, IA: Willian C. Brown.
- FIS. (2013, 2014). *FIS Snowboard Judges Manual*. Federation Internationale de Ski, Switzerland.
- Garcia, R., & Calantone, R. (2002). A critical look at technological innovation typology and innovativeness terminology: A literature review. *Journal of Product Innovation Management, 19*, 110–132.
- Girginov, V. (2010). Culture and the study of sport management. *European Sport Management Quarterly, 10*, 397–417.
- Gubrium, J., & Holstein, J. (2002). *Handbook of interview research: Context and method*. London: Sage.
- Gwebu, K. L., & Wang, J. (2011). Adoption of open source software: The role of social identification. *Decision Support Systems, 51*, 220–229.
- Harding, J. W., & James, D. A. (2010). Performance assessment innovations for elite snowboarding. *Procedia Engineering, 2*, 2919–2924.
- Heino, R. (2000). New sports what is so punk about snowboarding? *Journal of Sport & Social Issues, 24*, 176–191.
- Hoeber, L., & Hoeber, O. (2012). Determinants of an innovation process: A case study of technological innovation in a community sport organization. *Journal of Sport Management, 26*, 213–223.

- Hogg, M., & Smith, J. (2007). Attitudes in social context: A social identity perspective. *European Review of Social Psychology, 18*, 89–131.
- Humphreys, D. (1997). Shredheads go mainstream'? Snowboarding and alternative youth. *International Review for the Sociology of Sport, 32*, 147–160.
- Karp, H. (2009). When snowboarders baffle the judges. *Wall Street Journal*. Retrieved from: <http://www.wsj.com/articles/SB10001424052748704431804574541711988394566>.
- Kessler, E., & Chakrabarti, A. (1996). Innovation speed: a conceptual model of context, antecedents, and outcomes. *Academy of Management Review, 21*, 1143–1191.
- Magdalinski, T. (2000). Performance technologies: Drugs and Fastskin at the Sydney 2000 Olympics. *Media International Australia, Incorporating Culture & Policy, 97*, 59–69.
- Mason, D. (2002). 'Get the puck outta here!' media transnationalism and Canadian identity. *Journal of Sport & Social Issues, 26*, 140–167.
- Meyer, A., & Goes, J. (1988). Organizational assimilation of innovations: A multilevel contextual analysis. *Academy of Management Journal, 31*, 897–923.
- Miles, M., & Huberman, A. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). London: Sage.
- Pfister, G. (2011). Sportification, power and control: Ski-Jumping as a case study. *Junctures: The Journal for Thematic Dialogue, 8*, 51-67.
- Punch, K. (2013). *Introduction to social research: Quantitative and qualitative approaches*. London: Sage.
- Rinehart, R. (2000). *Arriving sport: Alternatives to formal sports*. In J. Coakley & E. Dunning (Eds.), *Handbook of Sport Studies* (pp. 504–520). London: Sage.

- Steen-Johnsen, K. (2008). Networks and the organization of identity: The case of Norwegian snowboarding. *European Sport Management Quarterly*, 8, 337-358.
- Tajfel, H. (1974). Social identity and intergroup behaviour. *Social Science Information/sur Les Sciences Sociales*, 13, 65–93.
- Tajfel, H. (1982). Social psychology of intergroup relations. *Annual Review of Psychology*, 33, 1–39.
- Tajfel, H., & Turner, J. (1979). An integrative theory of intergroup conflict. In W. Austin & S. Worchel (Eds.), *The Social Psychology of Intergroup Relations* (pp. 33–47). Monterey: Brooks/Cole Publishing Company.
- The Guardian. (2014, August 18). PSV Eindhoven fans protest against introduction of Wi-Fi at stadium. *The Guardian*. Retrieved from <http://www.theguardian.com/football/2014/aug/18/psv-fans-protest-against-wifi-access>
- Thorpe, H. (2004). Embodied boarders: Snowboarding, status and style. *Waikato Journal of Education*, 4, 181–201.
- Thorpe, H. (2005). Jibbing the Gender Order: Females in the Snowboarding Culture. *Sport in Society*, 8, 76–100.
- Thorpe, H. (2010). Bourdieu, gender reflexivity, and physical culture: A case of masculinities in the snowboarding field. *Journal of Sport & Social Issues*, 34, 176–214.
- Thorpe, H. (2012). “Sex, drugs and snowboarding”:(il) legitimate definitions of taste and lifestyle in a physical youth culture. *Leisure Studies*, 31, 33–51.
- Thorpe, H., & Wheaton, B. (2011). ‘Generation X Games’, Action Sports and the Olympic Movement: Understanding the Cultural Politics of Incorporation. *Sociology*, 45, 830–847.

- Turner, J. (1985). Social categorization and the self-concept: A social cognitive theory of group behaviour. In E. Lawler (Ed.), *Advances in Group Processes: Theory and Research* (pp. 77–121). London: JAI Press.
- Turner, J., & Reynolds, K. (2008). The Social Identity Perspective in Intergroup Relations: Theories, Themes, and Controversies. In R. Brown & S. Gaertner (Eds.), *Blackwell Handbook of Social Psychology: Intergroup Processes* (pp. 133–152). Oxford: Blackwell Publishers Ltd.
- Wheaton, B. (2000). ‘Just do it’: Consumption, commitment, and identity in the windsurfing subculture. *Sociology of Sport Journal*, *17*, 254–274.
- Wheaton, B. (2007). After sport culture rethinking sport and post-subcultural theory. *Journal of Sport & Social Issues*, *31*, 283-307.
- Wheaton, B., & Beal, B. (2003). Keeping It Real: Subcultural Media and the Discourses of Authenticity in Alternative Sport. *International Review for the Sociology of Sport*, *38*, 155–176.
- Wilmot, M. R. (2005). Baseball Bats in the High Tech Era: A Products Liability Look at New Technology, Aluminum Bats, and Manufacturer Liability. *Marquette Sports Law Review*, *16*, 353-380.
- Wolfe, R. (1994). Organizational innovation: Review, critique and suggested research directions. *Journal of Management Studies*, *31*, 405–431.
- Wolfe, R. (1995). Human resource management innovations: Determinants of their adoption and implementation. *Human Resource Management*, *34*, 313–327.
- Wolfe, R., Wright, P., & Smart, D. (2006). Radical HRM innovation and competitive advantage: The Moneyball story. *Human Resource Management*, *45*, 111–145.

Zaltman, G., Duncan, R., & Holbek, J. (1973). *Innovations and organizations*. New York: Wiley.

Zitzewitz, E. (2006). Nationalism in winter sports judging and its lessons for organizational decision making. *Journal of Economics & Management Strategy*, 15, 67–99.



Figure 1: Example of an official half-pipe snowboard course (FIS World Cup competition half-pipe, Leysin, Switzerland).

Elite Half-Pipe Snowboarding

Innovation context

Questions

1. What does being a snowboarder mean to you?
2. Are snowboarders distinct from other groups, other sports, and other people? How?
3. What do you feel are the strengths associated with the current subjective half-pipe snowboarding judging system (the Overall Impression System)?
4. What do you feel are the weaknesses associated with the current subjective half-pipe snowboarding judging system (the Overall Impression System)?
5. Recently, technology that can automatically measure and calculate the exact airtime (AT), jump height (JH), and degree of rotation (DR) associated with each trick / manoeuvre performed during a half-pipe snowboarding run has been made available. This technology is considered to be objective performance monitoring technology, is specific to the sport of half-pipe snowboarding, could provide objective information about each jump performed during a run, and has been proposed to make the scoring more accurate and reliable. Are you aware of any of these recent technological advancements?
6. Do you feel that the capacity of technology to automatically provide competition judges with accurate, objective information on air-time, jump height, and degree of rotation could assist judges in accurately and reliably assessing performance in elite-level half-pipe snowboard competitions? Why or why not?
7. Imagine if this objective performance monitoring technology is to be integrated into half-pipe snowboarding competitions. What sort of impact or outcome do you think integrating something like this into elite-level snowboard competitions would have on the sport itself and the snowboarding community in the future?