Digitalization in Action Sports: Blessing or Curse?

Structured abstract

Purpose: Identify how the use of digital technology for performance and commercial aspects of action sports can both create and destruct value.

Methodology: Exploratory research based on 30 interviews with coaches, athletes, judges, federations, fans and sponsoring organizations from Europe, across 5 action sport disciplines that are included in the Olympic program.

Findings: Value creation of digital technology use related to the performance aspect of action sports fall into two categories: performance enhancement and performance evaluation. Value creation related to the commercialization aspect of action sports relate to specific technologies, in particular a video streaming and a centralized data and engagement platform, as well as to possibilities for betting and making sponsoring more measurable. Notably, such value creation opportunities are also accompanied by possible value destruction, as they interfere with the ethos of action sports (i.e., the unique nature and special culture).

Originality: Drawing from service-dominant logic and adopting the value creation/destruction lens, this paper is the first to study how digitalization in the areas of performance and commercialization may further intensify tensions related to the ethos of action sports. Our approach is inclusive in terms of the types of digital technologies, action sport disciplines, and stakeholders considered.

Keywords: Action sports; Digitalization; Service-dominant logic; Value creation and destruction.

Introduction

Since their gradual inclusion in the Olympic program since 1984 and the establishment of the X games in 1995, action sports have received more attention from researchers and the public at large. Action sport "refers to a wide range of mostly individualized activities such as surfing, skateboarding, and free-running, which share a common ethos distinct from that of many traditional institutionalized sports" (Thorpe and Wheaton, 2011, p. 832). Some key differences between mainstream sports and action sports are that action sports: consider participation to be less about competing, but more about having fun (Ko *et al.*, 2008); involve a strong cultural element of anti-establishment (Thorpe and Dumont, 2019); typically involve more danger and risk (Ko *et al.*, 2008); involve less centralized governance (Strittmatter *et al.*, 2019); and are more dynamic in terms of rules and competitions (Thorpe and Wheaton, 2011). Another important difference is that while mainstream sports have long been associated with striving to improve performance (e.g., breaking records) and commercialization (i.e., financial profits) aspects, these mutually reinforcing processes are more recent phenomena in action sports. However, focusing on performance and commercialization has been found to be in contradiction with the ethos (original "vibe") of action sport (Thorpe and Wheaton, 2011).

Digitalization has further intensified the development of performance and commercial aspects of mainstream sports (Stegmann *et al.*, 2023; Xiao *et al.*, 2017). A prime example of how digital technologies have improved the performance aspects of several sports (e.g., baseball, motorsports), is their adoption of analytical decision making (Fonti *et al.*, 2023; Xiao *et al.*, 2017). As to commercialization, streaming and social media have been identified as game changers (Balliauw *et al.*, 2020; Clausen *et al.*, 2018), as they offer federations, teams, and athletes alike new sponsorship and fan interaction opportunities. It is important to note that the

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COVID-19 pandemic further accelerated digital commercialization initiatives (Smith and Skinner, 2022; Stavros *et al.*, 2022).

This raises questions as to whether theories and practices of sports management and digitalization that are applied to performance and commercialization aspects of mainstream sports, also apply to action sports (Harding *et al.*, 2016). Furthermore, as digitalization is a catalyst for the transformation of these aspects (Xiao *et al.*, 2017), the tensions related to the ethos of action sports are likely to come under focus. Against this background, the aim of this study is on the one hand to better understand possible ways in which the application of theories and practices of digitalization in action sports creates value, as perceived by different actors/stakeholders. In addition, this study actively seeks to identify potential threats of value destruction, in particular in terms of the ethos of action sports. In sum, the research question is formulated: *"What are ways in which the uses of digital technology related to the performance and commercial aspects of action sports can create and destruct value ?"*

To address this question, we adopt a service-dominant logic lens (Vargo and Lusch, 2004, 2008, 2016). This lens has been found to be useful to better understand how the engagement of different stakeholders in action sports is "individually valuable and collectively meaningful" (Grohs et al., 2020, p. 69). Also, our approach is inclusive in terms of considering various digital technologies, action sport disciplines, and stakeholders. First, our stance towards the type of digital technology was inclusive, allowing for the relevance of specific technologies to emerge from the empirical setting. Second, multiple action sport disciplines were included in this study to obtain a comprehensive perspective, as each discipline has its idiosyncratic characteristics and historical trajectories in terms of performance and commercial aspects (Ellmer and Rynne, 2019). Furthermore, it has been highlighted that especially in the context of

digital innovations, it is important to consider the perspective of different types of stakeholders (Harding *et al.*, 2016; Mazurova *et al.*, 2022). Hence, a strength of our paper is its comprehensiveness, as the 30 interviewees across 5 action sport disciplines did not only include judges, athletes and coaches, but also fans and event organizers.

Literature review

Two topics that jointly informed this study are reviewed: (1) the evolution of performance and commercial aspects of action sports and how these have engendered tensions related to the ethos of action sports and (2) a service-dominant logic perspective on the use of digital technologies in action sports.

Action sports: Performance, commercialization, and ethos

Several papers have discussed the evolution of performance and commercial aspects of action sports over the last couple of decades (Ellmer and Rynne, 2019; Harding *et al.*, 2016; Thorpe and Dumont, 2019; Thorpe and Wheaton, 2011). Action sports had started around the 1960s and were regarded as a lifestyle (Ellmer and Rynne, 2019), which had little to do with mainstream sports (Harding *et al.*, 2016; Thorpe and Wheaton, 2011).

Important milestones for progress on the performance and commercial aspects of action sports are associated with the inclusion of disciplines into either the summer (e.g., windsurfing) or winter (e.g., snowboarding) Olympic Games. This was initiated by the International Olympic Committee (IOC) to overcome the lack of interest from younger audiences in the Olympics. Such inclusion is symbolically important for the legitimacy of sport disciplines (Batuev and Robinson, 2019) and is associated with disciplines becoming mature (Ellmer and Rynne, 2019).

However, the inclusion of action sport disciplines into the Olympic program has been referred to as a complex and difficult process involving many interwoven factors (social, cultural, political, economic) (Thorpe and Wheaton, 2011). For instance, when the IOC wanted to include skateboarding into the Olympic program, skateboarders worldwide initiated a petition highlighting that "Skateboarding is not a sport" (Thorpe and Wheaton, 2011).

Another major turning point was related to the launch of the X Games, the "Olympics of action sport" (Thorpe and Wheaton, 2011, p. 830). The first summer X Games were held in 1995, the first winter X Games followed in 1997 (Thorpe and Wheaton, 2011). These events were an initiative of US-based television channel ESPN and assembled several action sport disciplines. The X Games reached a global audience and with this media exposure came additional interest from sponsors (Strittmatter *et al.*, 2019). The commercialization process was intertwined with performance aspects of action sports, as the globally mediatized X Games became a competitive arena for pushing technical and artistic boundaries (Thorpe and Wheaton, 2011). This put in motion a reinforcing cycle, as focusing on performance improves the possibilities for athletes to secure and maintain sponsorship deals.

These evolutions had unearthed elements of what makes action sports unique and as such engendered tensions or dualities related to performance and commercialization aspects. For instance, as windsurfing was included into the Olympic program, a duality in the sport has ensued (Thorpe and Wheaton, 2011): windsurfing in the Olympics is focused more on performance (i.e., speed) and is in that regard akin to the sport of sailing "perceived to be old fashioned, traditional, and elitist," whereas the more popular forms of windsurfing outside of the Olympics (e.g., freestyle) "focus on the more aesthetic, creative, and spectacular aspects" (Thorpe and Wheaton, 2011, p. 835). Similarly, the inclusion of climbing in the Olympics led to

the emergence of two sub-categories: *historical* climbers valued adventure, life outdoors, and camaraderie, whereas *sport* climbing centred on safety, media coverage, advanced equipment, and formal competition (Batuev and Robinson, 2019).

What also became evident is that rules were defined and applied in a loose way in action sports (Harding et al., 2016), which is in keeping with the anti-authoritarian and resistance ethos (Ellmer and Rynne, 2019). For instance, in snowboarding rules "were discussed on the mountain with peers" (Strittmatter et al., 2019, p. 1656). Yet another performance-related element is coaching, which for a long time has been disregarded in most action sport disciplines (Thorpe and Dumont, 2019). Instead of formal and hierarchical training, making progress was reliant more on informal learning from peers (Ellmer and Rynne, 2019). As to opposing commercialization, clear evidence was provided by the introduction of the X Games, as Strittmatter et al. (p. 1657) noted that "the increased commercialization created a dissonance with the sports' initial identity which valued participation, an alternative community spirit and was anti-establishment, non-institutional, and process-oriented."

Service-dominant logic and digitalization in action sports

Value is an important cornerstone of current marketing thinking, which Vargo and Lusch (2008) defined broadly as what enhances the well-being of actors. Key notions of service-dominant (S-D) logic are that value is created when resources are integrated by multiple actors within a service ecosystem (Vargo and Lusch, 2016). Also, the value created is referred to as "in-use" (as opposed to value-in-exchange) and as "in-context," as the available resources are highly dependent on the situation and the links among the actors. Put differently, value is subjectively

perceived by individual actors and is dynamic as it may differ across time and space (Li and Tuunanen, 2022).

Drawing from S-D logic, Woratschek et al. (2014) have proposed the sport value framework, which adds elements specific to the sports context, such as the importance of emotions and loyalty, as well as the recognition of the important role of actors such as volunteers and non-profit organizations. Moreover, there is a central notion of coopetition in sports: surely different teams compete, but they also need each other (cooperation), for instance to make for an attractive league. The authors also draw attention to multiple levels of value creation and emphasize that sports management research should focus on the interplay of actors at the meso-level (network of actors), while also considering interfaces with the lower levels (intra-within organization and micro-dyadic/triadic relationships). Consistent with this multi-level view of value creation, Vargo and Lusch (2016) expanded their S-D logic by explicating the role of institutions. They note that institutions involve norms, rules, and symbols, which are actor-generated, and which can act as enabling and constraining factors for value creation. The authors further noted that institutions can be formal (codified) or informal (social conventions) and that they "make social life predictable and meaningful" (Vargo and Lusch, 2016, p. 11).

More recently, S-D logic (e.g., Lee and Kim, 2022) and the sport value framework (Stegmann et al., 2023) have been associated with value creation based on the use of digital technologies. Like value creation, definitions of digitalization and digital transformation also include goals related to enhancement or improvement of actors' situations (Stegmann et al., 2023). However, others have also emphasized the potential destructive side of digitalization (i.e., diminishing value or well-being). As digital technology use can result in both outcomes that are beneficial and detrimental, Li and Tuunanen (2022) advocate for studying both value creation

and destruction at the same time. Based on a synthesis of the literature, Li and Tuunanen (2022) provide examples such as technology making social interaction more cost-efficient, personalized, and fun (value creation), but potentially involving a loss of privacy (value destruction) and while a single platform can provide various types of information (value creation), there may be issues of excessive or misleading information.

In the sports context, different types of value have been identified. Yoshida et al. (2013) aimed to redefine value and extended it beyond cognitive (functional) evaluations to include symbolic and hedonic dimensions. In a case study on action sports, Grohs et al. (2020) further developed the value concept and included beyond economic (functional) and hedonic value (emotional), also cultural, social, and status dimensions. Yet these studies did not focus on digitalization. In their scoping review in (mainstream) sports, Stegmann et al. (2023) observed that while several studies had examined digital technologies for sports marketing (i.e., social media, second screens, virtual reality, fantasy sports, eSports), they had not done so using a value creation perspective. The authors also noted that resistance towards the use of digital technologies may be expected, as different actors have different priorities (Stegmann et al., 2023).

Some prior work has studied the use of digital technologies for performance and commercialization aspects of action sports (yet not with an S-D logic lens). As to enhancing performance through digitalization in action sports, new training possibilities have arisen due to the use of online and social media, for instance to (re-)view stunts and tricks. Using BMX as a setting, Ellmer and Rynne (2019) explain how the use of technology (video camera on the bikes) benefitted performance progress, namely by studying courses prior to the race and sending real-time input to coaches who can provide more specific feedback. The case of technology-

supported judging in half-pipe snowboarding, however, provides an example of resistance to

technological innovation (Harding et al., 2016). While the technology was introduced to improve

the integrity, accuracy, and consistency of judging, it was also believed to lead to undesired

conformity and ultimately "the death of half-pipe snowboarding" according to a judge (Harding

et al., 2016, p. 227).

As to the commercialization of action sports, social media have become the go-to

platform for athletes to interact directly with fans and to promote themselves and their sponsors.

By engaging in digital media work, multi-skilled athletes have been able to increase and

diversify their income (Thorpe and Dumont, 2019). At the same time, the pressure on athletes is

mounting in terms of establishing an online identity, growing a network of fans globally, and

producing exciting content (Batuev and Robinson, 2019). In addition to these high demands

related to online and social media activities, other initiatives that would benefit the popularity

and commercialization of action sports have been negatively perceived. A case in point is

provided by the introduction of a paid streaming service in sport climbing, as it received a lot of

backlash (Batuev and Robinson, 2019).

The goal of this paper is to contribute to research at the intersection of the two themes reviewed

here. The reviews shows that prior work has documented the evolution of performance and

commercial aspects and how this has engendered tensions related to the ethos of action sports.

Also, prior work has identified ways in which digital technologies can be used to further advance

performance and commercialization aspects of action sports, yet has not done so in a

comprehensive way and neither has the S-D logic been leveraged to do so. Therefore, the present

study investigates how the use of digital technologies by actors in the action sports ecosystem are

associated with value creation, for performance and commercialization aspects, as well as how

digitalization may destruct value. Given value is context-specific, it may be perceived differently

by different actors. For this reason, we decided to involve different types of stakeholders in our

study.

Methodology

Given the exploratory nature of our research question, the complexity and dynamicity of the

action sports ecosystem, and the emerging nature of digitalization therein, a qualitative method

was chosen (Yin, 2014), involving desk research and in-depth interviews. Moreover, our

approach was inclusive in terms of (1) the type of digital technologies; (2) the scope of action

sport disciplines; and (3) the variety of stakeholders considered. First, our study did not focus on

specific digital technologies in order to let the most relevant technologies emerge from the

interviews. Second, stakeholders' opinions were investigated in the context of actions sports as a

whole, rather than focusing on one specific discipline. In particular, the following were included:

skateboarding, surfing, BMX (freestyle), snowboarding and Freeski. To identify action sport

disciplines that are already somewhat developed in terms of performance improvement,

commercialization, and digitalization, the selection criterion was whether the discipline had been

included in the Olympic program.

Third, using convenience and snowball sampling techniques, 30 stakeholders were

interviewed: 3 coaches, 3 athletes, 3 international judges, 4 representative of federations, 9 fans,

and 8 representative from various organizations active in action sports. The interviewees were

either active or ex-professionals in action sports. As to the fans, they were actively involved in

following and watching action sports on a continuous basis. To protect the respondents from

undesirable consequences and assure their privacy, pseudonyms are used (see Table I). The

interviewees lived across Western-Europe and the interviews were conducted via video-

conferencing. In addition to the advantage of flexibility, video-conferencing can reduce bias

because of socially desirable responses (Roulston and Choi, 2018). The interviews typically took

between 30 and 60 minutes and all interviews were transcribed. After 30 interviews, data

saturation was reached (Guest et al., 2006).

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As to the primary data collection instrument, the interview guide was semi-structured and

involved open questions that were designed with the aim of eliciting perceptions and honest

opinions related to the research question. The question referred to both benefits and potential

downsides of the use of technologies for performance and commercialization aspects of action

sports. The term "digital and data-driven technologies" was generally used in order not to put the

focus on one specific technology. Several questions were asked to all interviewees, yet some

variation was possible depending on the specific stakeholder group. Also, we ended each

interview by asking "Is there anything else related to this topic that you are thinking of or that

needs to be considered?" to ensure we had covered all the important areas. Using NVivo, our

analysis involved three steps: open coding to identify 47 individual codes from the interview

transcripts. For this first coding step, data sampling was utilized, which entails concentrating on

the most pertinent segments of the transcriptions (Saunders et al., 2016). The coding process

incorporated a combination of deductive and inductive approaches. For the deductive coding, the

literature reviewed provided guidance. Simultaneously, openness to codes that emerged

prominently from the data was maintained (Braun and Clarke, 2021). In a next phase, selective

coding was used to group codes into themes; and finally axial coding helped to unearth

relationships among the codes and themes. Both authors actively participated in this analysis

process.

Findings

Our findings are organized into three sections. The first two sections show the perceptions of

interviewees related to the value creation possibilities of digitalization for performance and

commercialization aspects of action sports respectively. The third section then illustrates how

these processes may also be associated with value destruction, in particular in relation to the

ethos of action sports.

Value creation related to the performance aspect of action sports

Value creation possibilities related to the digitalization of performance aspects that emerged

from the analysis, can be further grouped into two categories. First, the performance

enhancement category encompasses value creation related to training or developing skills,

monitoring health, and detecting talents. Second, the performance evaluation and scoring

category (i.e., judging) includes value creation related to quality, consistency, and transparency.

Performance enhancement

The perception of action sports athletes and coaches towards the use of digital technologies for

performance enhancement was generally positive. In particular, data generated by wearables can

make training practices more effective by precisely pointing out what needs to be improved. The

following comments illustrate this value creation possibility:

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If you have a lot of data about yourself, you can work better on your weaknesses, I think. If there is an analysis that shows that my airs are not good enough then I know what I can work on. Also as a coach to support your athletes, this seems great to make your athletes even better. (Ken - Coach)

You have black on white what you need to work on. Whereas before you were kind of like, maybe I should practice this a little bit or that, but when you have a proper statistic it will be clearer what you need to work on. (...) So probably there's going to be a more precise way for training and improving yourself. (Phillemon - Athlete)

Another value creation possibility that arose within the performance enhancement category was the use of digital technology for monitoring health, which is highly relevant for action sports in which athletes frequently experience trauma: *"There are some technologies related to health because again, it's related to high-performance sports where just every aspect of the sport gets measured out more and more." (Jack - Federation)* Furthermore, interviewees saw possible value in using digital technologies, such as a centralized platform, in terms of detecting young talents:

We're doing some work with surfing Australia, where we are capturing all of the surfing competitions that are running across Australia by small local clubs. And then we're awarding points in a national ranking to help them identify talent. So it's a talent identification opportunity. (Charlie - Organization)

The qualifying series can all be followed live via their app and this ensures that you can see emerging talents. In snowboarding, the non-World Cup competitions, you can hardly follow anywhere. You can only follow live scoring, but you have no idea what the athletes actually did. (Sean - Athlete)

Performance evaluation

The second category of value creation involves performance evaluation and scoring. The interviewees recognized that digital technology could overcome some of the shortcomings related to a human panel of judges (e.g., limited perception and bias). Judges and others asserted that digital technology use for judging could provide accurate and precise information to judges and then in turn more transparent and clear feedback to athletes.

> *A person can make mistakes, and a jury member can make mistakes, so if this can be avoided by means of a system, this seems positive to me. This also reduces the risk of discussions. (Ken - Coach/Athlete)*

> *If you're using digital technology or data for scoring ... you can make it easier for judges to score. ... And then together with that, it will also help bring consistency and fairness. (Jacob - Federation)*

> *We store all the judges' credentials when they're using live feeds for judging. So you can track the scoring performances of different judges and that provides transparency. (Charlie - Organization)*

Value creation related to the commercialization aspect of action sports

Several interviewees found it important to make action sports more popular with a broader audience, which in turn would bring commercialization possibilities in the form of additional revenue streams. To put this virtuous cycle into motion, the interviewees highlighted the value creation possibilities of digital platforms, as well as referred to sponsorship and betting possibilities.

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Digital platforms

Two types of digital platforms were identified: one that provides video streaming possibilities and another one that centralizes data and enables fan engagement. As to streaming platforms, the following interview quotes highlight their strategic importance:

How do we get skateboarding out to more people? Digital has to play a part in that because the youth of today does not watch television in the traditional way, so how can we properly use technology? So, whether that's YouTube or some other streaming platform, how can we use those to show skateboarding to as many people as possible, which then helps us to generate more fans or more affinity with the community? (Jacob - Federation)

Our target segment is younger people, and they are on their mobile phones on their end. And we want to engage with them, obviously. So, I think we can use these streaming platforms in a very smart way. (Vardan - Organization)

There is a great opportunity for action sports to combine their streaming services and offer one streaming platform for multiple action sports. (Jimmy - Fan)

The interviewees identified value creation related to streaming by offering an enhanced storytelling experience for spectators through the display of extra information, either to explain the rules or simply add excitement:

The audience doesn't have that much information about the sports, how the contest is run, what the rules are, etc. They don't know who the winner could be as they just don't have enough information. … If they see more information about athletes or events, it might get them more interested in the sport. (Latrice - Organization)

> *It will make watching these sports and following these sports more enjoyable, and*
>
> *it will create more understanding. And if you're able to enjoy and understand something*
>
> *... I think then you can engage with it. (Albert - Organization)*
>
> *The more numbers and statistics and just basically pure data that you see on the*
>
> *screen, the more interactive your audience is. (Sam - Judge)*
>
> *I am envisioning real-life measurements of speed and G-forces during a race or a*
>
> *live first-person view of the athletes. (Theo - Fan)*

A particular advantage of streaming (relative to linear broadcast television) was related to the role of weather conditions in action sport disciplines like surfing: *"The streaming platforms are able to investigate whether it will be a good day in terms of weather conditions for a surf contest. So, they can communicate earlier on which day and what time they are going to do the live stream." (Lars - Fan)* Others on the other hand still believed that broadcasting had a role to play: *"You have to know about skateboarding from somewhere. Nowadays, it is not available equally in every country globally. Broadcasting of skateboarding on national platforms and TV stations will bring more accessibility to it for the audience." (Marco - Judge)*

The second type of digital platform, perceived to offer value in terms of accessing fans and then further commercializing action sports, involved centralized data and engagement. The following were considered key ways: access to athlete information and user generated content.

As to athlete information, this is currently fragmented, unsynchronized, and generic, and searching for it takes fans a lot of time. Most action sports fans try to collect information about their favourite athletes from different sources on the internet (e.g., Wikipedia) and by following them on various social media (e.g., Facebook or Instagram).

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It [a centralized platform] can provide a better experience for fans and people

who are interested in the sport because you can have a rich history of the competitor over

the years. (Charlie - Organization)

I like the biographies of athletes. Of course, I follow most of them on social media

and that's how I see what is going on in their life. For me it is rather about the basics,

how old they are, where they come from, and what their journey is so far. (Naomi - Fan)

I get a lot of emails from the media asking what I did in the winter season. On the

basis of such a centralized platform, they could also prepare better for the interview.

(Sean - Athlete)

Another interesting value creation opportunity of such a platform would be for (amateur) users to

upload their own data and content, as this comment from a fan and aspiring professional

illustrates: *"If you use video material in training sessions or you can collect some data about it*

so that you can compare yourself with professional athletes. This also seems very useful and fun

for recreational athletes." (Naomi - Fan)

Sponsorship and betting possibilities

Furthermore, the interviewees largely agreed that by further digitalizing action sports, the

opportunities for individual athlete sponsoring would increase:

Athletes are going to have more assets in their hands to market themselves.

Because they are going to be able to say, look I get 20,000 impressions on the stickers I

have on my board every year or month. While in the past it was more like look, I am kind

of good at this, please can you support me? ... With all the data it will be a more

informed decision for the sponsors. (Phillemon - Athlete)

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The easier it is to be seen online, the more reach you will gain, and potential

sponsors will approach you faster. Sponsors like visibility, so when competitions are

easier to watch, it becomes easier for athletes to gain this visibility. (Sean - Athlete)

In addition, new sources of revenue were envisioned for action sports, such as betting. Some fans

expressed a clear interest: *"I think the betting industry and the action sports world could really*

benefit from each other. For me personally, it becomes more attractive and exciting to watch

when I can bet on an athlete to win." (Lowell - Fan) However, other stakeholders were much

more cautious: *"The betting opportunity obviously poses risks around introducing action sports*

into the wagering world. It brings challenges around corruption and shading and all that sort of

things that we haven't had to worry about in the past." (Charlie - Organization)

Value destruction related to the ethos of action sports

Several interviewees brought up difficulties to implement digital technology use for the

performance or commercialization aspect of action sports that are due to potential conflict with

the core identity of action sports. Some went as explicit as stating: *"It would kill the vibe of*

action sports." (Maarten - Organization) Another interviewee referred to a fear to become

mainstream:

Action sports have always been perceived as an outsider sports. And the more that we put

statistics on it and the more we make it look like traditional sports, the more mainstream

we make them, the more we turn into golf, soccer, or hockey. (Sam - Judge)

Performance aspects

As to digitalization for the performance aspects, several of the comments referred to how precise

measurement, as a potential way for enhancing the performance aspect of action sports, could

actually destruct value. For instance, some stakeholders pointed out how precise measuring

opposes action sports characteristics such as freedom, creativity, excitement, surprise, and

lifestyle:

Data can learn us a lot but it can give you the feeling that everything is measured

too much and the freedom of the sport is lost. I think style and creativity should remain

very important, and I don't think that this is easily convertible to data. (Mason - Fan)

[Action] sports are not super structured and do not follow a very strict path of

what you can and cannot do. There is a big element of excitement and surprise, like

watching competitions and seeing a new trick. (Albert - Organization)

There are a lot of components [that are] hard to measure: [...] style, creativity,

and flow remain very important. Action sports are also kind of a lifestyle, [which makes

it] really hard to measure I think. (Silva - Judge)

Many stakeholders also saw issues with digitalization related to the evaluation and scoring of

performance. In particular, several interviewees indicated that the use of digital technology for

judging has limitations related to incorporating subjectivity in appreciating style and evaluating

execution:

It could harm the sport. You cannot quantify, classify or assign some aspects of

action sports because they are very individual and subjective in the way of the execution

and in the environment in which they are executed. And to analyze it properly, there's a

long way to go with the developers and the data that they are working with. (Marco -

Judge)

The same trick can get very different scores depending on the athlete's style. In

my opinion, this is the mistake people made in snowboarding. There, style matters less

and less. Everyone does the same manoeuvres to the extreme and the fun is therefore a

bit gone. So we are going to have to look for the boundary or balance between [digital

technology] helping and screwing up. (Ken - Coach/Athlete)

Let's simplify it just down to big air, which is really easy because all we're

comparing is trick for trick ... these riders are doing the exact same tricks. If I could

show you, my sheets for say a big air contest, and out of the 16 riders that we've got, 12

of them are doing one and the same trick. We have to be able to differentiate that. And

the way we differentiate that is as execution, how they do that trick, how they take off,

how they land. And I don't think that there's any way to teach a machine to do that. (Sam

- Judge)

Another potential value destructing factor related to introducing a digital system for evaluation is

that action sports are continuously evolving at a rapid pace with athletes often presenting new

tricks at a competition. The interviewees felt that a system could not be simply programmed as it

would require constant updating. Moreover, putting in place standardized rules would be

difficult, because action sports take place in (naturally or artificially) varying environments.

Another criterion that we've got is progression, which is basically showing us

something that nobody else has done before. That might actually mean doing a trick that

has lesser difficulty, but if you do this trick in a new and unique way and execute it well,

there is a chance that you get a higher score than a more difficult trick. So there are

times when a less difficult trick will beat a more difficult trick just because it's new, just

because it's interesting, just because it's progressive, just because it's creative. (Sam -

Judge)

How can you define it when every field of play – each skate park – has a different

design, and every obstacle has a different size? Every obstacle has a different depth

height or angle. When it comes to rails coming down the stairs how would you compare

these and use this analytic data for the supporting judging tool? (Marco - Judge)

Skateboarding is a dynamic sport. It still evolves. New tricks are developed,

invented, and practiced or improved. And it doesn't have a firm structure or firmly

assigned points to any manoeuvres, tricks, or obstacles. Therefore creating a statistic to

predict and analyze things is very difficult. (Marco - Judge)

<u>Commercialization aspects</u>

As to making action sports more accessible and popular through digital technologies, leading

into commercialization, some stakeholders pointed at potential value destruction: *"We have to be*

careful when new technologies are getting involved because then a lot of these aspects of why

people really like action sports are going to be lost." (Albert - Organization) More specifically,

several stakeholders saw a risk of providing too much information through digitalization:

It could be a risk of over-information, you know, information flood. I think on a

more socio-ethical level, and then on a cultural level, losing the essence of action sports,

which is sometimes maybe not made to be put into data or converted into data. And

sometimes it's just a nice air and you don't need to know how many tweaks and how

much rotation and how much speed and all that was. So I see a risk of over-stimulus.

(Jack - Federation)

A pitfall that I do see is when too much data is provided. For example, someone

does a little trick, and a huge range of numbers appear immediately. I feel like this can

make it look too artificial. The genie of the sport would be lost. If you focus too much on

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the data and technologies, and too little on the sport, it could have the opposite effect. (Lars - Fan)

> *I do not think having more data and technologies available necessarily makes the sport more attractive to the audience. It is more about the actual sport and that the spectators feel related to it. (Phillemon - Athlete)*

Discussion

This paper set out to identify value creation and destruction related to the use of digital technology for the performance and commercial aspects of action sports.

As to value creation of digital technology for the **performance** aspects of action sports, two categories emerged from our analysis: performance enhancement and performance evaluation. These categories are consistent with important areas identified in earlier work focused on digitalization in action sports (Ellmer and Rynne, 2019; Harding et al., 2016), yet this study goes beyond identifying areas by providing specific instances of each and by relating the categories to ethos-related tensions, as discussed next.

For performance **enhancement**, the value creation (i.e., developing skills, monitoring health, detecting talents) stems largely from the measuring capabilities of digital technology. However, (exact) measurement is also found to destruct value as it clashes with the ethos of action sports (e.g., focus on freedom and creativity) (Strittmatter et al., 2019). As to performance **evaluation**, value creation of digitalization is found to be in terms of accuracy, consistency, and transparency, which are also important factors to improve on in order to be included in the Olympic program (Harding et al., 2016). However, digitalization is also associated with

difficulties in terms of evaluating the style of execution and coping with the evolving nature of

the sport (Ellmer and Rynne, 2019), which is why value may potentially be destructed.

The question arises whether and how value creation and destruction due to digitalization

in action sports may differ from mainstream sports (Ko et al., 2008)? Our findings related to the

performance enhancement aspects of action sports indicate that digitalization can be perceived as

a catalyst for undesired conformity and control (Thorpe and Wheaton, 2011). This is in contrast

with mainstream sports, in which there is a strong tendency to control every (training) detail to

obtain marginal gains (Knobbe et al., 2017). Hence, the conclusion can be made that the tensions

related to performance *enhancement* are unique to (the ethos of) action sports. Instead, for

performance *evaluation*, similar tensions have been observed in mainstream, judged sports such

as gymnastics (Mazurova et al., 2022). Notably, there is an ongoing debate in this discipline on

whether humans can be replaced by (automation) or should be assisted by (augmentation)

Artificial Intelligence systems (Mazurova and Standaert, 2024).

As to value creation of digitalization for **commercialization**, prior research in action

sports has mostly focused on social media (Thorpe and Dumont, 2019). Also, while streaming

services have been mentioned, they were perceived negatively (Batuev and Robinson, 2019).

Our findings add further insight by advancing specific value creation mechanisms, in terms of

providing explanation and adding excitement for viewers. These findings are consistent with

prior work on mainstream sports (Petrović et al., 2015; Stavros et al., 2022). However, for action

sports, again tensions arise since such abundant information may actually distract from the

essence of the sports. Another technology that came to the fore involves centralized data and

engagement opportunities, which is in keeping with a recent scoping review in sports (Stegmann

et al., 2023). Our findings provide initial responses to open questions on the adoption,

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motivations, and barriers of such platforms for value creation in sports marketing (Stegmann et al., 2023).

Implications, limitations and future research

Our research contributes to the sports (innovation) management literature in several ways. First, our work responds to calls for research (Thorpe and Dumont, 2019) to examine the fast-moving and dynamic implications of digital technology use specifically for action sports, including related barriers and challenges (Harding et al., 2016) and to do so with a value lens (Stegmann et al., 2023). Adopting the S-D logic lens, our findings reveal interesting dynamics between multiple levels. For instance value can be created in a relationship of trainer-athlete, but this may destruct value at the institutional level. While this study only provides initial evidence, it does suggest that the sport value framework could be applied to action sports (in addition to mainstream sports) by considering the ethos as enabling and constraining factor more prominently. In this regard, this study provides an important first step as it adds to recent work focusing on exploring the ethos of action sports (Batuev and Robinson, 2019; Strittmatter et al., 2019). In conclusion, the tensions that were identified indicate that digitalization can simultaneously be considered a blessing and a curse for action sports.

In addition, our work is of high relevance to managers, as our findings provide insight into the benefits and potential drawbacks of technologies that should be considered to ensure successful innovations (Harding et al., 2016, p. 229). Our findings highlight the importance for marketing manager of consulting various stakeholders in the innovation process and of carefully crafting the framing of the innovation in order to keep with the ethos of action sports. Furthermore, the insights related to some specific types of technologies could be of interest to

practitioners. For instance, our interviewees state their preference for one centralized and

integrated content and engagement platform (Stegmann et al., 2023). Such initiative would

require coordination across governance bodies, which is one of the current hurdles in action

sports (Strittmatter *et al.*, 2019). Instead, we might expect that private companies (e.g., Red Bull

or Burton Snowboards), which act as sponsors for events or individual athletes in action sports

and exercise de facto governance roles such as rule making (Strittmatter *et al.*, 2019), also take

the lead in developing such content and engagement platforms.

A key strength of our work is its inclusive approach, in terms of considering different

types of technologies, action sport disciplines, and stakeholders. However, our data collection

was not large enough to allow for inferring generalizable insight for individual technologies,

disciplines, or stakeholder groups. Future research, which may be quantitative in nature, could

draw from our findings to set up a study that provides robust findings at the intersection of the

three. As to the diversity in our set of stakeholders, including fans, media, and sponsors has been

called for in prior studies on action sports (Harding et al., 2016). At the same time, the limited

number of athletes interviewed (3) can be considered a limitation. This low number should not

be surprising given the difficulty in getting access to athletes who are "not only busy, but often

protected by various levels of gatekeepers built into the sporting infrastructure" (Thorpe and

Dumont, 2019, p. 1640).

Other interesting avenues for future research on the digitalization of action sports include

examining and contrasting the performance and commercialization opportunities across various

hybrid physical-digital sport configurations (Goebeler et al., 2021). Another interesting area lies

at the intersection of digitalization and diversity issues: how can digital technologies be used to

make both the professional athletes and the fans more diverse? In particular, gender and social

class have been identified as relevant to action sports (Sharman *et al.*, 2024).

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Tables

Table I

List of interviewees

#	Interviewee (pseudonym)	Role	#	Interviewee (pseudonym)	Role
1	Albert	CEO of start-up active in action sports	16	John	(former) Athlete
2	Charlie	CEO of start-up active in action sports	17	Phillemon	Athlete
3	Conner	Events manager at sponsoring organization	18	Sean	Athlete
4	Daniel	Managing director at events organizer in action sports	19	Sam	Judge
5	Donatello	Representative of an events organizer in action sports	20	Marco	Judge
6	Latrice	Representative of an events organizer in action sports	21	Silva	Judge
7	Maarten	Representative of an organization active in sports	22	Lowell	Fan
8	Vardan	Representative of an organization active in sports (judging)	23	Mason	Fan
9	Juan	Representative of the sport Federation	24	Simona	Fan
10	Jacob	Representative of the sport Federation	25	Lloyd	Fan
11	Jack	Representative of the sport Federation	26	Stuart	Fan
12	Franck	Representative of the sport Federation	27	Jimmy	Fan
13	Harper	Coach	28	Naomi	Fan
14	Sergio	Coach	29	Lars	Fan
15	Ken	Coach	30	Theo	Fan