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2021–2027

STRATEGIC RESEARCH & INNOVATION AGENDA

LEADING SPORT INNOVATION FOR GREATER SOCIETAL AND ECONOMIC IMPACT

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INTRODUCING THE ROAD TO HEALTHIER, MORE SUSTAINABLE AND SUCCESSFUL EUROPE

The EPSI Strategic Research & Innovation Agenda 2021 – 2027 has been developed as a guidance document with the aim of anticipating future innovation trends within the European sport ecosystem and instigating a co-ordinated action to take advantage of the opportunities presented. Promoting sport and an active heathy lifestyle among citizens, enterprises, public bodies, universities, schools, research centres, federations, clubs, clusters and community associations has quantifiable beneficial effects for all sections of society and creates positive spill-over effects into many economic sectors. This document therefore aspires to inspire both public and private stakeholders in their quest to develop their appreciation of the relevance of sport, physical activity and vitality in modern societies and it seeks to have this sector appropriately recognised in their agendas. It also sets out a series of actions for EPSI members and the wider sport research and innovation community that together represent a co-ordinated strategy for the next phase in realising the full potential of the sport, physical activity and vitality sector.

A new strategic research and innovation agenda

The EPSI Strategic Research & Innovation Agenda 2021 – 2027 is a key document for the research and innovation community that focuses on sport, physical activity, active healthy lifestyle and related areas. It addresses the different stages of typical sport value chains and associated research and innovation activities and it builds on a similar document covering the years 2016-2021. This earlier document broke new ground by highlighting the importance of sport and physical activity for physical and mental health, in responding to increasingly personalised needs in the evolving sports market and in contributing to change arising from data use, technology and innovation. It went on to set out in some detail which technologies stemming from sport science, physiology, or information science, among others, are shaping new and growing markets and how the research and innovation community in the area can contribute to business creation and a growing economy. It also highlighted the potential contribution of the sector to mitigating climate change and promote sustainability, by exploiting fundamental basic human characteristic i.e. that we are 'designed to move'.

In the years since the previous document, much has changed. Appreciation of the importance of sport and physical activity for the health of individuals and society as a whole has grown significantly as well as the sector's commercial aspect and its contribution to modern lifestyles. In turn, the sports sector has become more aware of its potential and the sport research and innovation community has gone from strength to strength. At the same time, this community and the sports sector generally have faced major challenges, notably from the impact of Covid 19 directly on the sector and on society more widely, but also from the continuing evolution in technologies and markets and

major changes in the policy environment. The policy changes have arisen especially as a result of the substantial developments in the priorities and implementation mechanisms of EU policy and programmes stemming from their re-orientation for the new programming period. Added to this have been the internal dynamics of the sport sector and the changing patterns of demand for sport goods and services.

With the Covid crisis, the global sporting goods industry contracted in 2020, for the first time since the financial crisis of 2007–08, according to a recent Mckinsey report. And some of the changes in this period are expected to persist into the recovery, including the relatively good performance in the second half of the year of sports-equipment makers (particularly bicycle and digitally enabled fitness equipment). The

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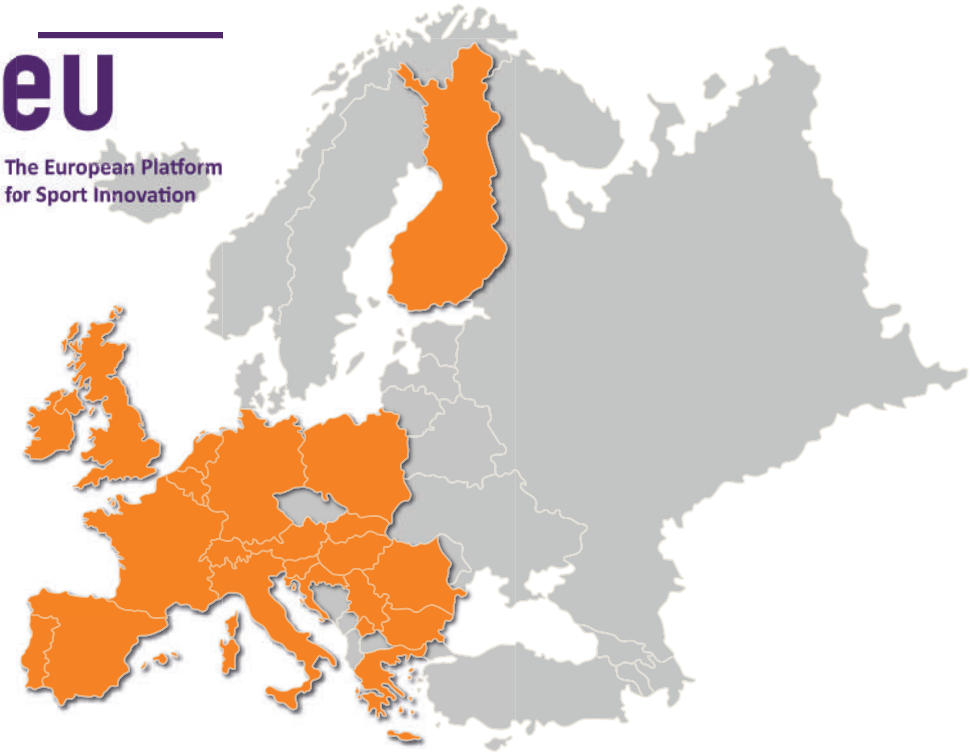
The European Platform for Sport Innovation



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pandemic further blurred the lines between work and free time and between leisure and sport activity, with some of the biggest activity increases seen in outdoor individual sports, home exercise, yoga, e-sports, and virtual races. Over the longer term, the economic significance of sport is likely to be enhanced, as well as its contribution to both health and social relationships. Sport is a new sector and an early adopter of news ideas and innovations. It has huge potential especially when its neighbouring sectors are taken into account - transport, tourism, culture, health, space, education and social inclusion, to name just some of them.

The sport research and innovation community continue to grow and develop, but must adapt to major changes in the social, economic and policy environment in the last few years, in order to develop a much more consistent, united and persistent strategy and effective interaction with policy makers and decision processes.

EPSI: connecting and supporting ambitions and actions

EPSI (European Platform for Sport Innovation) is a not-for-profit membership organisation, based in Brussels and operating across Europe, that speaks for the research and innovation community in the areas of sport, physical activity, healthy lifestyle, vitality and all related sectors.

Benefits of working with EPSI: Competitive Advantages

At the same time as sport and physical activity are developing an enhanced profile in our lives in so many ways, the sport research and innovation community is becoming more organised and better co-ordinated in its interactions with the representatives of other neighbouring sectors and with policy makers. The community members range from those working in universities and research centres through to those developing the more marketable dimension of the sport value chains at higher TRL and SRL levels – people that are really delivering products and services to the market. They interact in a variety of ways with policy initiatives, from strategic contributions to active development and smart specialisation strategies through Q-helix innovation clusters to support for specific enterprises in I-HUBs and as part of sport-related innovation ecosystems. This is all helping the sector to realise its potential. To continue and enhance this process, however, it is necessary to recognise the important changes that are taking place in policy priorities and decision-making processes. In the European context, this includes the re-orientation that has taken place in major policy frameworks and programmes, notably the MFF, Next Generation EU, the European Green Deal, Horizon Europe, the Cohesion Policy Funds and Erasmus +.

In this context EPSI has a major role to play, as a representative of the sport research and innovation community located at the interphase between research and innovative processes, involving all the elements of the quadruple helix - universities, research centres, national regional and local governments, as well as industry, businesses in all development stages and clusters (including SMEs, spin-offs, start-ups, scale-ups and midcap enterprises) and end consumers. EPSI with its wide constituency composed of both private and public entities, can coordinate the sector's views, collect, share and feed in innovation ideas - through bottom up processes - and thus speak with an authoritative voice, but to be heard it needs to have a clear and coherent message. This Strategic Research and Innovation Agenda provides the basis for that message.

THE IMPORTANCE OF SPORT AND INNOVATION

by Commissioner Maryia Gabriel

Sport and physical activity are not only a vector for positive values and a source of inspiration, as the recent Olympic and Paralympic games showed. They also help to live a healthier life, at all ages. Sport, coupled with a healthy lifestyle is a booster for health that can actually prevent disease.

The World Health Organisation affirms that the absence of sport and physical activity is a major risk of mortality. With an increasing inactive European population, there is more than ever a greater need for more sport in Europe.

Beyond health and well-being, sport is an important economic driver worth € 310 billions per year, employing over 5 million people across the EU before the pandemic. The economic value of sport goes far beyond goods or services: it is an integral part of sectors like tourism, events or mobility.
Since the beginning of the pandemic in 2020, the entire sport sector was hit very hard by restrictions. While the pandemic had a negative impact on many local clubs, it also set the basis for an unprecedented change in the way we work, socialise and practice sport. Many innovations have taken place, and they have concerned the sport sector too. Let us think for instance about the growing number of people now following online training classes provided by their sport club or by personal trainers.

Indeed, sport flourishes and grows thanks to innovation.

Innovation can take many forms, from hi-tech solutions that help defy forces of nature such as gravity or wind to new ideas that change the way we practice sport. But its greatest impact is perhaps to be seen in the development of para sports.

From prosthetics to carbon fibre wheelchairs and assisted devices, technology in this area is advancing immensely with new materials and improved designs. We witnessed all this while supporting our athletes in the Tokyo 2020 Games. This is when sport promotes inclusion at all levels that it is at its best.

Bringing innovation to society at large can be a challenge. Unlike other sectors, innovation in sport needs to respond to everyone's needs, the whole population in all its diversity: from leisure to competitive athletes, from health-related equipment and services to sport tourism and events.

Innovation can increase citizen's participation in sport and physical activity. It can bring about new business models, benefitting the whole sector. It can be channelled into improving health and sustainability.
To bring the benefits of innovation to all, I launched in September the innovative **HealthyLifestyle4All** campaign during the European Week of Sport.

The **HealthyLifeStyle4All** campaign promotes a holistic approach to healthy lifestyles addressing health, physical activity, and nutrition together. More and more, all of these subjects go hand in hand.
Innovation in sport frequently thrives on the collaboration among different sectors. The European Commission supports cutting edge innovation projects in sport thanks to EU programmes like Erasmus+, Horizon Europe, Digital Europe, EU4Health or the Cohesion Funds.
Any research and analysis coming from the sector itself, like the current report, is very welcome to identify the challenges and opportunities ahead.

I am committed to supporting and helping the sport sector grow, in line with our objectives of a green, digital and inclusive European Union.

Mariya Gabriel
Commissioner responsible for Innovation, Research, Culture, Education, Youth and Sport

EXECUTIVE SUMMARY

The EPSI Strategic Research & Innovation Agenda 2021 – 2027 is a key document for the research and innovation community that focuses on sport, physical activity, vitality and related areas. It is a document that represents a unique meeting point in Europe's Strategic Research and Innovation Agenda. It aims to provide an orientation for the sector by providing guidance that anticipates future innovation trends. It also sets out a series of actions for EPSI members and the wider sport research and innovation community that together represent a co-ordinated strategy for the next phase in realising the full potential of the sport, physical activity and vitality sector.

In the years since a similar document covering the years 2016- 2021, much has changed. Appreciation of the importance of sport and physical activity for the health of individuals and society as a whole has grown significantly as well as the sector's commercial aspect and its contribution to modern lifestyles. In turn, the sports sector has become more aware of its own potential and the sport research and innovation community has gone from strength to strength.

At the same time, this community, and the sports sector generally, have faced major challenges, notably from the direct impact of Covid 19 on the sector and on society more widely, but also from the continuing evolution in technologies and markets and major changes in the policy environment.

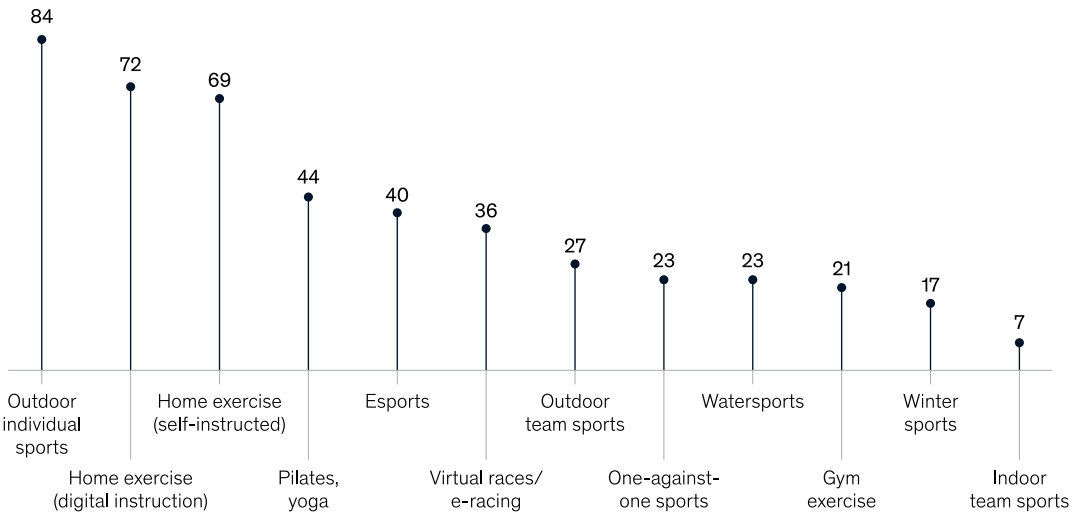
With the Covid crisis, the global sporting goods industry contracted in 2020, for the first time since the financial crisis of 2007–08 . Some of the changes in this period are expected to persist into the recovery. The pandemic further blurred the lines between work and free time and between leisure and sport activity, with some of the biggest activity increases seen in outdoor individual sports, home exercise, yoga, e-Sports, and virtual races.

Sport is a new sector and an early adopter of news ideas and innovations. It has huge economic and social potential, especially when its neighbouring sectors are taken into account - transport, tourism, culture, health, education and social inclusion.

As sport and physical activity are developing an enhanced profile in our lives, the sport

Individual outdoor sports and home exercise are expected to experience a lasting increase in participation in 2021.

Expected increase in participation in 2021 vs pre-COVID-19, % of respondents



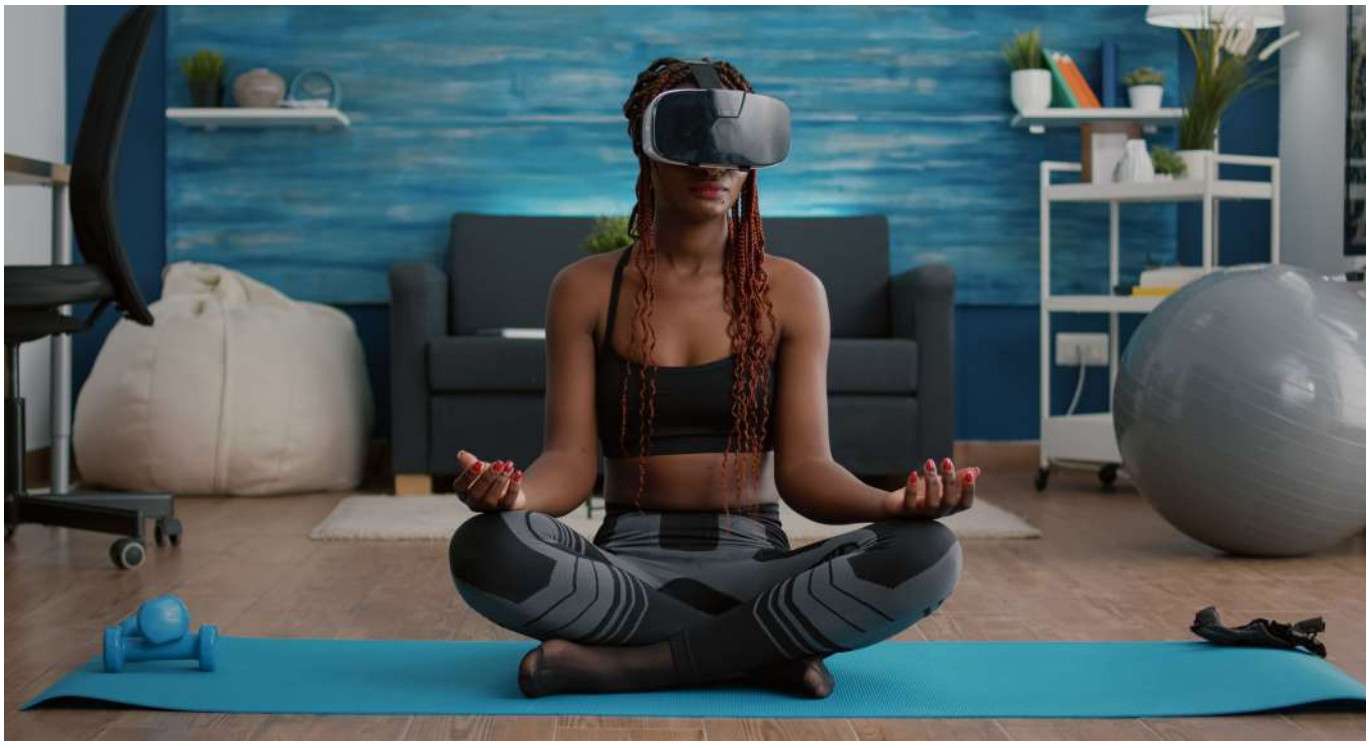
Source: "The Global Sporting Goods Industry Report 2021," a joint report from McKinsey and the World Federation of the Sporting Goods Industry, October 2020, n = 130

research and innovation community is becoming more organised and better co-ordinated in its interactions with the representatives of other sectors and with policy makers. The community members range from those working in universities and research centres through to those developing the more marketable dimension of the sport value chains at higher TRL and SRL levels – people that are really delivering products and services to the market. They interact in a variety of ways with policy initiatives, from strategic contributions to active development and smart specialisation strategies through Q-helix innovation clusters to support for specific enterprises in I-HUBs and as part of sport-related innovation ecosystems. This is all helping the sector to realise its potential. To continue and enhance this process, however, it is necessary to recognise the important changes that are taking place in policy priorities and decision-making processes.

EPSI has a major role to play, as a representative of the sport research and innovation community located at the interphase between research and innovative processes, involving all the elements of the quadruple helix - universities, research centres, national regional and local governments, as well as industry, businesses in all development stages and clusters (including SMEs, start-ups, scale-ups and midcap enterprises). EPSI can therefore speak with an authoritative voice, but it needs to have a clear and coherent message.

EPSI as an organisation together with its members, and working with the broader sport innovation community, therefore aims to articulate, lead and facilitate the programmes of sport research and innovation that will transform the sport sector in Europe over the next decade, and enhance its contribution to resolving the societal challenges faced by all European countries.

In pursuing these aims, the EPSI community's main contribution will be through the further development of mission-driven innovation



ecosystems that transform research and knowledge into practical real-life solutions and products.

EPSI's stated mission is to:

- strive for innovation-friendly conditions for the EU sports ecosystem and its neighbouring sectors,
- articulate and co-ordinate programmes of research and innovation,
- help its members to develop technological and other forms of innovation,
- secure the required financial support, and
- create and scale up sport businesses across the entire innovation spectrum and thus contribute the general growth of the European economy.

The potential for action by the research and innovation community, and by EPSI and its members more particularly, is being shaped by a series of significant trends that have to be taken into account in developing a strategy. These are partially driven by technology, but also by social developments and those taking place in the policy framework.

The 'Lisbon Call on Sport and Innovation' presented at a 'Seminar on Sport Innovation – Beyond Business as Usual' on 16-17th June 2021, under the Portuguese EU Presidency, is an indication of the recognition that the role of sport now enjoys and its potential for innovative contributions in many areas of the lives of EU citizens. The Call also asks sport organisations, researchers, innovators and private enterprises to commit themselves to addressing the challenges and opportunities of innovation in sport. Part of the intention of this document is to respond to this Call.

The time has come to make a qualitative change in the way that the sport and physical activity sector, and the sport research and innovation community in particular, organise themselves and contribute economically and socially. They have to deliver on the promise that is now widely recognised and show what they can really do.

The sport research and innovation community can provide valuable support to the process of Active Development but ought itself also to adopt a more systematic and consistent approach to the research programmes and innovation processes that it develops, so that it can increase the power and impact of its activities.

It needs to:

- Move from developing individual and isolated projects to implementing a much more coherent and consistent programme of action in the form of integrated research and innovation programmes addressing the main issues where sport in its widest sense can make a distinctive contribution
- Encourage members of the community to focus on developing a common effort to address the key issues and challenges targeted by the programmes
- Define clearly the nature of the main challenges and opportunities that the community is to address in its research and innovation programmes
- Ensure that the needs and requirements of end-users play a major role in defining the research and innovation programmes and in determining the form and performance of products and services
- Strengthen the methodologies deployed by the community, so that they are better defined, more robust and better supported by common (formalised) standards and testing regimes and more focused on resolving key issues.

In doing so, it can help to build a European Research Area.

The diversity of the sector and the variety of forms that sport and physical activity can take have to be recognised. There is therefore no single over-riding research and innovation programme that the community can adopt.

Rather it is a matter of identifying one or more programmes in each of the main areas where the sport research and innovation community operates.

Discussions with EPSI members and the wider sport research and innovation community suggest that there are four main areas where there are distinctive challenges and where responses are being made. These are summarised in the following sections, although it should be said that there are multiple interactions between these areas and many overlaps.

Health, the Individual & Society

Recent events have pushed into prominence the long-identified need for the medical professions and services to re-orientate themselves away from reactive medicine – curing patients when they get ill – to preventative medicine – helping human beings to avoid illnesses in the first place. This is often referred to as a transition from healthcare to a care for health.

There are considerable professional, institutional and practical difficulties in effecting such a transition and this problem in itself could become a significant focus for research, but there is also scope for research and innovative practice in many more specific aspects of the transitional process, such as the inter-relation of physical activity with nutrition and the contributions that that sport and physical activity can make to mental health, as well a further examination of which conditions exercise and physical activity can ameliorate and how services making use of research findings can translate the knowledge acquired into practical therapies, building perhaps on the work already done in medical institutions by physiotherapists and similar professions.

Another important theme in this area is designing urban environments to promote healthy lifestyles for people of all ages.

An agreed research and innovation programme for the sport research and innovation community is possible, with a core theme of sport and physical activity as a vehicle for the transition from healthcare to care for health. The EPSI community will

have to take an active part in articulating and elaborating this programme further, notably by identifying where the links between current activities can be strengthened and what steps can be taken to address institutional barriers in health systems and in education that are hindering the further development of

services and processes that can improve the general health of the population by helping citizens to undertake more exercise and physical activity.

The Economy

An elaboration of a research and innovation programme in this area relates to the multiple ways that that sport and physical interact with the commercial side of the economy by stimulating the production of facilities, equipment and apparel and in developing commercial services, often in interaction with related sectors, such as tourism.

The changing demand for sport products and services, including that arising from new forms of tourism, is an important driver in this area, but also the general changes in technology that allow innovation, including in nanotechnologies, 3D printing, clothing materials and construction.
The strengthening innovation ecosystem also has to be taken into account. There has been a steady growth of sport-based clusters in recent years, together with the development of a broader sport innovation ecosystem assisted by the growth of Quadruple -helix systems and Innovation Hubs for Sport and Vitality.

There is a case for addressing the variable quality of some of the products that are brought to market by the sport-based industries and the consequent impacts, including through the development of more extensive standards and testing regimes.

The economic dimension of sport and physical activity, therefore, offers an almost bewildering variety of opportunities for the sport research and innovation community, This in itself re-enforces the argument for a more systematic mapping of opportunities and the links between them that can help consolidate research and innovation programmes and provide the occasion for the development of more consistent methodologies.

Two research and innovation programmes suggest themselves. The first is in relation to the application of developments in materials science to sport goods and activities. The aim here would be to attempt to make links and promote cross-fertilisation between different areas of materials research and applications, identify gaps in knowledge and experience and promote developments to fill these gaps. The second area for a possible research and innovation programme relates to the interaction of sport and physical activity and tourism, especially in the form of activity tourism.

Here the innovation required is partially technical, in the development of appropriate equipment, especially for members of the general public who are less skilled than devotees of the particular sport or activity. However, there is also considerable scope

for organisational innovation, both in respect to business models for enterprises operating in the sector and also in the provision of support infrastructure and facilities by development authorities that wish to promote activity tourism.

The Digital Transformation

The Digital Transition must be actively pursued. Developments in the collection and use of data are now of central importance for the sport sector, especially in relation to sports performance and for use in a variety of media. The scientific assessment of improvement in performance sports has become a major factor in determining their competitive position and there continues to be a development of a range of services based on data analysis.

But data have much broader applications in sport and related areas and are being used in a whole range of new products and services, from sport simulation to the gamification of products, in the monitoring and planning of sport facilities and supporting the transition from healthcare to care for health.

As elsewhere, data mining, machine learning and Artificial Intelligence are all changing existing processes and opening up new possibilities. All of these major developments could make a substantial contribution, for instance, to the transition from healthcare to care for health and the role of sport and physical activity within it.

Exploitation of 5G and further generations of telecoms technology and the extension of the Internet of Things undoubtedly will figure predominantly in new applications in the sport sector, including where these are combined with developments in sensor technology, which has many specific applications in sport and physical activity.

Data mapping and representation too are contributing significantly to effective use of the data being generated and present a range of opportunities. So too does gamification and the use of digital twins.

The EPSI community is not generally in the position to shape the direction of travel in digital technologies as such. Rather, it tends to be a receiver and exploiter of technology produced elsewhere. Its focus, and its strength, is more on the application of these technologies to improve the physical and commercial performance of individuals and teams engaged in sport and physical activity and to support the management of these activities.

A central theme in the application work undertaken by the community is performance – the development and provision of products and services monitoring or aiding the performance of individuals and teams across many sports and forms of activity, but also assessments of the performance of these products and services themselves. The two types of performance are intimately related, given the importance of accuracy and serviceability in services and products supporting the performance of individuals and teams.

The second strand in the performance area, namely the performance and quality of the products and services being delivered, is very much tied to the enhancing of the performance of individuals and teams, even though its relevance goes way beyond the area with which it is associated in this instance. Data can increasingly be exploited to contribute to performance in this second sense, providing feedback on products and services, assisting with accuracy and helping to measure and assess impact, both in real time and over the long term.

An area that is distinctively its own is the contribution to measuring and enhancing performance and we have seen that this has to be understood to include a continuous

evolution of highly performant products and services in the sport and physical activity sector. Helping to develop a more co-ordinated and consistent approach to developments in performance goods and services appears to be a priority for the EPSI community.

Climate change & the environment

In the face of climate change, all sorts of sport organisation will have to change their habits and practices and examine the facilities that they use to ensure that they are more sustainable. The issues that have to be faced are not in most cases unique to sport, but sport activities from the staging of events to relatively benign activities, such as individuals walking, running and cycling have to consider their own impact on the environment.

The sport research and innovation community is in a good position both to support sport organisations in analysing their environmental impact and in providing solutions. It can also help sport organisations to contribute to the wider communal effort needed to affect a green transition.

The relationship between sport and both the physical environment and its extension into the social environment provide scope for the development of research programmes and a range of research and innovation projects for the sport research and innovation community. The challenge, of course is to articulate these clearly and align them with policy trends, but it should be possible to review the main areas where the greening of sport has to take place. The review would then go on to identify those areas where the sport research and innovation community can make the greatest contribution to supporting and implementing the processes involved.

Conclusions

EPSI serves a research and innovation community that focuses on sport, physical activity, an active healthy lifestyle, vitality and related areas. As EPSI, its members and this broader community move forward into the new programming period, EPSI's new Strategic Research & Innovation Agenda needs to have both coherence and ambition to be able to support the true potential of the sector effectively and allow it to respond to the opportunities and challenges that have been outlined in previous sections.

An important consideration is that the new Strategy needs to align itself with the priorities and implementation processes of the new policy and research frameworks so that it develops with the grain rather than attempting to cut across it. Moreover, EPSI has to be at the forefront of any innovation processes that bring to the market the products and the services of the future. However, in doing this, EPSI and its members should also recognise

that they are well positioned at an important intersection in the research and innovation landscape between active research and its application in a range of innovative products, services and processes. It is therefore in a position to take a leading role in contributing to and developing the efforts of the whole of its research and innovation community.

Consequently, it is proposed that the following represent the main elements of the EPSI Strategic Research & Innovation Agenda for the period 2021 to 2027.

ACTIVATE THE COMMUNITY

- EPSI and its members should help the sport research and innovation community move from inspiring but isolated projects to the development of more substantial and consistent research and innovation programmes that make a much greater impact.
- EPSI and its members should equally inspire and enrich the sport business creation dimension.
- To this end, it should promote the detailed articulation of specific research and innovation programmes that both address the broad themes arising in the main areas where sport research and innovation can respond to social, technical and commercial challenges facing European societies and do so in a way that maximises their chance of receiving adequate funding.

RESPOND TO SOCIETAL CHALLENGES

- In particular, an early priority ought to be a research and innovation programme to support and help implement the transition from healthcare to care for health. This should be followed progressively by the elaboration of the other main research and innovation programmes identified in this paper.
- In order to reinforce this new thrust in its research and innovation agenda, EPSI and its members should successively develop detailed characterisations of each specific research and innovation programme, setting out the challenges and needs to be met and the policy and business contexts, the key themes of the programme, the range of solutions to be sought, the processes and instrumentation to be developed and the partners and networks to be involved.
- EPSI and its members should also make major contributions to developing the methodologies deployed in its area.

CONNECT AND CREATE CROSS-OVERS

- To assist in these processes, EPSI should consult and work with other parties active in the sport research and innovation community, especially at a European level. It should also work and create cross-overs with related sectors, such as smart systems, ICT, health, nutrition and textiles and apparel.

STRENGTHEN THE RESEARCH AND INNOVATION ECOSYSTEM

- In elaborating the research and innovation agenda, it should actively aim to promote development of the European Research Area in the field of sport research and innovation and help articulate ERA priorities for the sector.
- EPSI should build on and further develop regional excellences and ambitions and, its work with Q-helix innovation clusters, further promoting the concept of Living Labs and contributing to the development of innovation ecosystems, including by forming a European network of Innovation Hubs for Sport and Active healthy lifestyle.

SUPPORT MEMBERS

- EPSI should continue to develop its work in supporting members who are writing and submitting research proposals, especially for EU funding, including by developing tools to assist in the preparation of proposals.
- So as to ensure a factual and up to date operational implementation of any tangible objectives related to this SRIA, reflecting the evolution of the times, EPSI will elaborate, as a separate paper, a periodical, annual "implementation road map" with both quantitative and qualitative Key Performance Indicators. The completion and realisation of these KPIs will enable a clear impact assessment to be made.

The EPSI Strategic Research & Innovation Agenda 2021 – 2027 is a key document for the research and innovation community that focuses on sport, physical activity, active healthy lifestyle and related areas.

The community is faced with new challenges, to which they need to respond with a step change in the sophistication with which they carry out their activities. In particular, the sport research and innovation community need to move from interesting but isolated projects to develop much more systematic and co-ordinated research and innovation programmes in four key dimensions of its current activity: Health, the Individual & Society, The Economy, Digital Transformation and Climate Change & the Environment.

This strategy document has explained the challenges being faced by the EPSI community and has outlined how the necessary responses can be developed over the next period. As a result, there is the prospect of an exciting new period in the development of EPSI and its members that will raise the output and performance of research and innovation and considerably enhance its status:

The SRIA can be seen as a call for action for all the EPSI community and the broader stakeholder group of private and public partners as well, encouraging them to unite their efforts, so as both to tackle the challenges and harvest the opportunities.

01

EPSI VISION E MISSION

Vision: "Leading sport innovation for greater societal and economic impact"

EPSI as an organisation together with its members, and working with the broader sport innovation community, aims to articulate, lead and facilitate the programmes of sport research and innovation that will transform the sport sector in Europe over the next decade. In doing so, it will enhance its contribution to resolving the societal challenges faced by all European countries, in areas such as health and physical resilience, climate change and the environment and contribute to enhancing the living standards of all citizens, not least by exploiting further the potential of digital technology.

In pursuing these aims, the EPSI community's main contribution will be through the further development of mission-driven innovation ecosystems that transform research and knowledge into practical real-life solutions and products.

In this context, it is agreed that 'Sport' refers to all those human physical activities that promote fitness, health, enjoyment and well-being. It encompasses activities generally recognised as sport, but also physical activities promoting fitness, health and vitality. It includes both "elite" sport and also sport at the "grassroot" level which ultimately will deliver the greatest impact on society. At the same time, it respects gender differences and the variety of economic and social backgrounds and includes people with all kinds of disabilities both physical and mental and all age groups in a multigenerational approach.

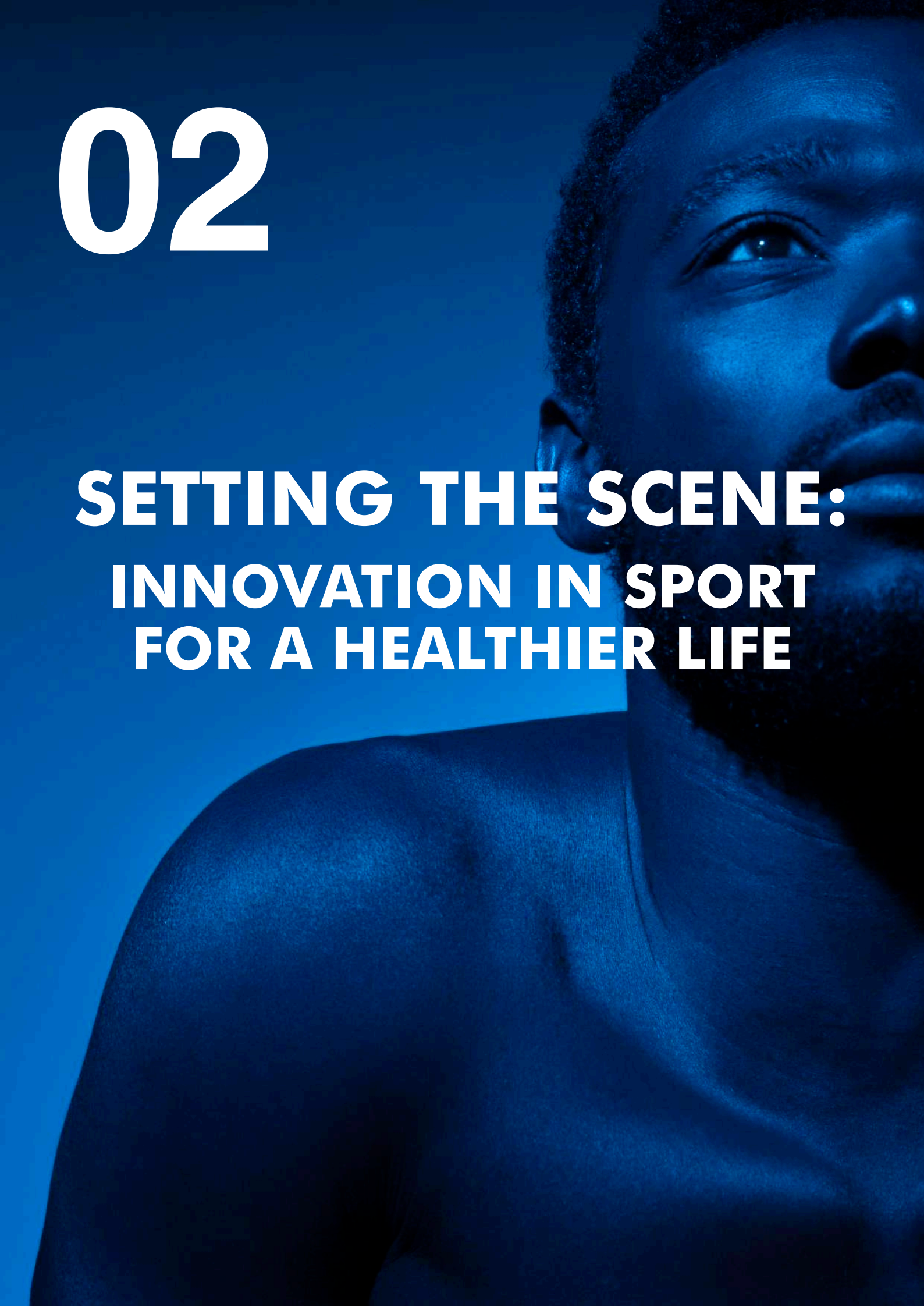
In pursuing these aims, EPSI acknowledges that it operates in the policy environment created by the EU, its Member States, especially in their applications in the regions and at local and municipal levels and recognises current policy priorities, notably the pursuit of environmentally and socially sustainable development.

EPSI's aims have been agreed after careful consideration and analysis and a thorough consultation of its members.

MISSION

EPSI's mission is to:

- strive for innovation-friendly conditions for the EU sports ecosystem and its neighbouring sectors,
- articulate and co-ordinate programmes of research and innovation
- help its members to develop technological and other forms of innovation, combining top-down and bottom-up approaches,
- secure the required financial support, and
- create and scale up sport businesses across the entire innovation spectrum and thus contribute the general growth of the European economy.



02

SETTING THE SCENE:
INNOVATION IN SPORT FOR A HEALTHIER LIFE

For most of human history, people needed to be physically active to survive. But, as the 2018 Eurobarometer on sport and physical activity indicates over the period since 2009, the proportion of people undertaking physical activity in Europe has declined, so that 42% of the population say they never exercise or play sport. Worldwide, physical inactivity and smoking are responsible for more deaths than any other modifiable risk factor . Moreover, clinical scientists are continuing to identify more characteristics that magnify the problem. It is already known that sitting time is associated with increased cardio-metabolic risk independently of levels of physical activity and low aerobic fitness is a risk factor for cancer and cardiovascular disease and mortality, irrespective of body fat . Currently, evidence is emerging that obesity has been a major contributory factor in determining the mortality rates of those infected with Covid 19 .

Sport and physical activity have been recognised as essential for reversing the growth of non-communicable diseases by the World Health Organisation , the European Union and national authorities for some time. It is now increasingly recognised that they are also important for mental health and have a significant role in building resilience to infectious diseases and potential global pandemics.

Sport and physical activity are therefore intimately related to human health and will become increasingly important, as the emphasis grows on the prevention of disease and ill-health rather than relying on a reactive cure to medical problems. The significance of sport and physical activity, however, goes well beyond its role in helping us to be healthy individuals. Most sports have a significant social dimension and participation in sports and physical activity has increasingly become an important feature of modern lifestyles. This means that they have developed a growing economic role, both in the growth of businesses deploying performance technology or simply by providing or supporting sport and physical activity services and also as a vehicle for developments in media content, promotion and advertising. Beyond this, sport makes a substantial contribution to education and training and the sport and physical activity community are taking determined action to meet the challenge of climate change and promote sustainability through for instance the “greening” of transport.

All these elements will be explored further below.

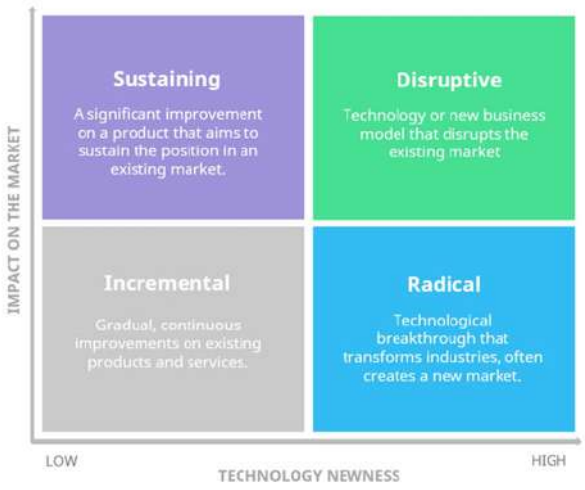
03

SPORT RESEARCH & INNOVATION AND THEIR APPLICATIONS: THE EMERGING AGENDA

The potential for action by the research and innovation community, and by EPSI and its members more particularly, is being shaped by a series of significant trends that have to be taken into account in developing a strategy. These are partially driven by technology, but also by social developments and those taking place in the policy framework. Innovation has to be interpreted here in the widest possible manner. It can take the form of changes in technology or new processes and procedures and involve products or services or a combination of both and it also includes creating innovative businesses and marketing models but also innovation related to architectural and societal developments. Moreover, in the context of this strategy innovation will be considered as ranging from "incremental" to "disruptive" and from "sustaining" to "radical". While there is still some way to go, appreciation has been growing on the part of policy makers and the general public of the central role of sport and physical activity in the operation of modern societies and in contemporary economic and business processes, both in terms of the supply of goods and services and of the factors influencing demand and market formation. This situation has only been underlined by the Covid crisis, first through the impact on the employment of people working in sports and sport facilities at all levels and then increasingly, because of the evident contribution that sport and physical activity make to community resilience and physical and mental health, as these have come under pressure.

The **'Lisbon Call on Sport and Innovation'** presented at a 'Seminar on Sport Innovation – Beyond Business as Usual' on 16-17th June 2021, under the Portuguese EU Presidency, is an indication of the recognition that the role of sport now enjoys and its potential for innovative contributions in many areas of the lives of EU citizens. The Call also asks sport organisations, researchers, innovators, public authorities and private enterprises to commit themselves to address the challenges and opportunities of innovation in sport. Part of the intention of this document is to respond to this Call. The time has come to make a qualitative change in the way that the sport and physical activity sector, and the sport research and innovation community in particular, organise themselves and contribute economically and socially. They have to deliver on the promise that is now widely recognised and show what they can really do.

Through the SHARE Initiative, sport organisations have called for a more systematic integration of sport and physical activity into economic and social development programmes and processes through an approach referred to as 'Active Development'. The argument is made that this integrated approach will not only promote a healthier, more active and resourceful society, with involvement of a greater range of citizens from across our communities, but it will also make other initiatives, for example those that promote innovation and growth, the digital transition and greater sustainability, much more effective in a variety of ways. The sport research and innovation community can provide valuable support to this process of Active Development, but ought itself also to adopt a more systematic and consistent approach to the research programmes and



innovation processes that it develops, so that it can increase the power and impact of its activities. It needs to do this in five ways.

It needs to:

- Move from developing individual and isolated projects to implementing a much more coherent and consistent overarching programme of action in the form of integrated research and innovation programmes addressing the main issues where sport in its widest sense can make a distinctive contribution
- Encourage members of the community to focus on developing a common effort to address the key issues and challenges targeted by the programmes
- Define clearly the nature of the main challenges and opportunities that the community is to address in its research and innovation programmes
- Ensure that the needs and requirements of end-users play a major role in defining the research and innovation programmes and in determining the form and performance of products, services and the combination of both.
- Strengthen the methodologies deployed by the community, so that they are better defined, more robust and better supported by common (formalised) standards and testing regimes and more focused on resolving key issues.

By 'research and innovation programmes' in this context, we are referring to programmes of action leading through appropriate research, innovative thinking and active product and service development to the realisation of practical solutions and, where appropriate, viable and substantial commercial propositions. The programmes require a shared perception of the problematic to be addressed and hence a shared set of strategic and operational objectives, appropriate facilities to pursue research and innovation and a community of researchers and innovators dedicated to the application of shared values and practices and deploying shared but evolving methodologies. Some may refer to this process as the development of common 'paradigms.

It is important that such research and innovation programmes should not be developed by the sector in isolation. They should fully recognise the broader policy environment and especially in the current context, developments taking place at a European level. Currently the most obvious are the responses to the Covid crisis and subsequent recovery and addressing the Green and Digital Transitions in the Recovery Plan for Europe . But there are also the more operational elements, for example the frameworks established across Europe's regions by smart specialisation strategies and the policies to promote clusters and innovation ecosystems. Specifically in relation to sport, there is the Sport Work Plan and for the sport research and innovation community, there are developments like ClusSport and the moves towards the EU Network of Innovation Hubs for Sports & Vitality. The development of research and innovation in relation to sport takes place within a knowledge environment that determines how research institutions operate and how they interact with industry, government and other interested parties in a complex ecosystem. The development of a European Research Area (ERA) has been on the EU's agenda since the year 2000 and is making gradual progress. The elements of the next phase in its evolution are currently being elaborated, following the Commission Communication on 'A new ERA for Research and Innovation' in September 2020.

Four strategic objectives have been set for the ERA in the next period:

1. prioritise investments and reforms in research and innovation, to support the

digital and green transition and Europe's recovery

2. improve access to excellent research and innovation for researchers across the EU
3. translate results into the economy to ensure market uptake of research output and Europe's competitive leadership in technology
4. make progress on the free circulation of knowledge, researchers and technology through stronger cooperation with EU countries

The sport research and innovation community has to align itself with these developments, if it is to seek support and promotion at a European level, but at the same time it shares the ambition of creating an operating European Research Area for its own community of researchers and innovators. This will require promoting research excellence and its effective translation into practical and commercial applications, encouraging joint programming across countries, the circulation of knowledge and the mobility of academics and students and the development and sharing of R&D facilities and infrastructure and digital access services. In this way the sport research and innovation community will be providing a direct example of the sort of integration that the ERA is seeking to promote. At a more detailed level, when it comes to seeking funding from Horizon Europe, the EU for Health Programme, the Cohesion Funds, and other sources, proposals must correspond to the objectives for these funds that have been defined for the new programming period 2021 – 2027. Overall, however, the sport research and innovation community is in a good position to take advantage of these opportunities, especially because of its potential contribution to the post-Covid recovery and boosting the resilience and competitiveness of our economy and societies, not least in the areas of the digital and green transition.

At the same time, however, the diversity of the sector and the variety of forms that sport and physical activity can take have to be recognised. There is not a single over-riding research and innovation programme that the community can adopt. Rather it is a matter of identifying one or more programmes in each of the main areas where the sport research and innovation community operates. In this way, there can be a generic research strategy that is also sensitive to differing conditions and challenges. Discussions with EPSI members and the wider sport research and innovation community suggest that there are four main dimensions of the overall research and innovation effort, where there are distinctive challenges and where responses are being made. These are as follows:

1. Health, the Individual & Society;
2. The Economy;
3. Digital Transformation;
4. Climate Change & the Environment.

These four axes represent distinctive areas of focus for the sport research and innovation community, although of course there are multiple interactions between them and many overlaps. It is proposed, however, to define sport research and innovation programmes in relation to each of them as the core elements of the EPSI SRIA for the next period.

The following sections will consider detailed elements in each of these dimensions in turn, looking at the drivers of developments in each area and the responses that the sport research and innovation community can make to each of them, before sketching out the potential areas for the development of more systematic research and innovation programmes. These will highlight the potential contribution of solutions from sport and physical activity to policy developments and to innovation ecosystems in general and thus delineate the major strategic options for the forthcoming period.

04

HEALTH, THE INDIVIDUAL & SOCIETY: SPORT INNOVATION TO IMPROVE LIVES

The human dimension of research and innovation is increasingly being recognised, though in many areas old habits die slowly. For many years now, it has been recognised, in principle at least, that while technological development remains of great importance in innovation processes, there are also important human elements. Innovation is not only about the development of new products, but also new processes, business models, social interactions and marketing techniques . Furthermore, as European economies have increasingly been composed of growing service sectors, which require especially active interaction with human customers, the importance of service innovation has become more and more apparent. Finally, particularly as Europe starts to address its relative failure in translating good ideas and original research into commercial success, the human element in innovation processes has begun to have a higher profile and especially the need for training and skills development as key elements in successfully delivering the results of research to the marketplace. These considerations apply to sport research and innovation at least as much as to any other area.

In particular, they apply to health, a sector which is steadily increasing its profile in modern societies, not least because of the manifold possibilities that have arisen with modern research and knowledge in the area, in terms of curing previously incurable conditions and helping many in society to live healthier and longer lives. This was true even before Covid 19, but the pandemic has reinforced the point dramatically.

Sport and physical activity is in a position to make important contributions to the improvement of human welfare through better health and vitality and to the development of the health economy. The following discussion points consider this proposition and how it might shape a significant research and innovation programme.

Sport as a driver for transition from healthcare to care for health and vitality

After years during which the WHO and the EU and increasingly national governments have recognised that sport and physical activity are essential for tackling non-communicable diseases , the Covid pandemic has revealed their role in preventing or diminishing the impact of communicable diseases too . Above all, recent events have pushed into prominence the long-identified need for the medical professions and services to re-orientate themselves away from reactive medicine – curing patients when they get ill – to preventative medicine – helping human beings to avoid illnesses in the first place. This is often referred to as a transition from a “healthcare system to a care for health” system.

Having said that, there are considerable professional, institutional and practical difficulties in effecting such a transition and this problem in itself could become a significant focus for research, but there is also scope for research and innovative practice in many more specific aspects of the transition

process, such as the inter-relation of physical activity with nutrition and the contributions that sport and physical activity can make to mental health, as well as a further examination of which conditions exercise and physical activity can ameliorate and how services making use of research findings can translate the knowledge acquired into practical therapies, building perhaps on the work already done in medical institutions by physiotherapists and similar professions.

In addition, if those developing services in this area are truly going to contribute to a shift from curative to preventative medical practice, these services need to find ways to anticipate the acute phase of problems that can be prevented by more and better exercise and physical activity, by identifying the problems as they begin to emerge and helping medical practitioners to deliver preventative action at that stage. An important consideration, of course, in making the case for the transition to care for health, in initiatives of this kind, is the potential that these approaches have for reducing costs in the welfare systems of EU Member States.

Promoting Active Healthy Lifestyles

At the same time a research and innovation programme in this area ought not to restrict itself to promoting the development of services that are delivered through medical institutions and practitioners. There is scope for action even before the early stages of the problems that exercise and physical activity can address become apparent. There is room for purely preventative action that also ought to be part of the research and innovation strategy. The role of sport and physical activity in making modern lifestyles healthier is an important theme.

As certain sections of society have begun to develop a strong interest in their personal fitness and the activities, they undertake to enhance it, they have increasingly come to see this commitment as part of a distinctive lifestyle and this has been further re-enforced by the media and advertising and especially by certain 'influencers' on social media and their followers. These developments have had significant economic effects, causing a growth in demand for a range of goods and services related to sport and physical activity, from the growing demand for fitness equipment and the even wider impact on clothing to the purchase of personal monitoring equipment and apps. More directly part of the action area currently under consideration, however, is the increased demand for sport facilities and gyms and related services such as personal fitness coaching.

Some of these markets have been hit hard by Covid, while others less so, but they generally, and the research and innovation supporting some of them, have considerable potential for future growth, especially once the recovery from Covid gets underway. There is growing evidence, examined in Chastin, S F M et al (2021) , that regular physical activity has strong, positive effects on the immune system and leads to a marked reduction in mortality rates from community-acquired infectious disease. In the post-Covid period, this is likely to encourage even greater moves towards healthy lifestyles, with impacts also in related areas, such as through a growing demand for healthier physical environments and a greater general awareness of sustainability issues that, for many people, seems to be part of a wish to develop a healthy lifestyle.

It is also the case that physical fitness and exercise contribute to mental alertness and an active mind-set and in this way to greater productivity in work settings and even greater inventiveness, confidence and leadership and hence more innovation . It is for this reason that many business organisations have sought to create working environments that actively encourage exercise, physical activity and sport and this too is part of the

sport and health strategy.

Covid has also prompted the development of physical activity and exercise at home, somewhat extending the idea of an active lifestyle, and often supported by digital tools, allowing exercises to be conducted at the same time as friends and colleagues in other remote locations or allowing personal trainers to direct activities and encourage greater effort virtually. This experience is also opening people up to experimenting with Exergaming.

A growing contribution to healthier lifestyles is coming from the role of sport and physical activity in determining and improving the shape of our physical environments, as its representatives have engaged in discussions about re-designing and developing urban spaces and community facilities, including transport infrastructure, and making them more orientated to human needs. These issues have been central to debates launched by the EU initiative on the New European Bauhaus , in which the sport sector is playing an active part.

The differing needs of citizens of different ages, physical and mental abilities, and from different social groups have to be taken into account, but a major consideration is the long-term tendency for the age of urban populations to increase. This calls for an adaptation of the urban environment to ensure continuing mobility for this group. This whole area presents numerous opportunities for new approaches and innovation, especially those arising from better interaction with all the other stakeholders in complex urban environments.

All these developments provide greater impetus to the use of sport and related activities as material for media content and promotion and advertising. These are areas where the generation and processing of information and visual content continue to develop and offer significant opportunities for new technology and processes and therefore for the sport research and innovation community. They also involve media through which the message of health through sport and physical activity can be disseminated.

Unfortunately, it has to be acknowledged that although lifestyle with significant sport and physical activity elements is probably a growing force, there are still important sections of the population – especially those with deprived economic conditions - , whose lifestyle is not influenced to any great degree by these elements. This continues to present a major problem for our societies. Hopefully one of the few beneficial effects of the Covid crisis will be that lessons about the importance of an active lifestyle will have been learnt, and in particular that investment in promoting healthy and active lifestyles can actually save money for health and welfare systems over the longer term. Education, of course, is another major consideration here, as is emphasised below.

Sport and its role in Social Integration

There are also wider aspects of the promotion of health through sport and physical activity, including positive spin-offs. The vital role of sport in addressing social inclusion was recognised in the EU Disability Strategy 2010-20, which aims to empower people with both physical and mental disabilities to enjoy their rights and participate fully in society. Sport has great strengths in its ability to engage wide sections of society from very different backgrounds in its activities, often meaning that through their sporting activities participants are able to meet and interact with people from social groups that they would never otherwise encounter. In this respect, sport often eases communication between these groups, since it depends less on verbal communication skills than other social situations and more on simple human interaction. Its

universality can transcend linguistic, cultural and national boundaries and facilitate communication across communities around the world, including as a means of bringing about reconciliation between divided and antagonistic communities and promoting social integration in multi-cultural societies, as has been demonstrated in many places such as for instance with the integration of refugees and asylum seekers.

There is also strong evidence that sports participation improves social behaviour and reduces crime and anti-social behaviour, particularly for young men. The evidence points to positive associations between participation in arts and sports and similar social activity and lower crime rates and better employment and other social outcomes. In this way sport and physical activity contribute to building social capital.
These processes can be supported and strengthened by innovations especially in technologies supporting them and communicating their achievements.

Sport for Skills and Education at all levels

Sport has a significant place in the school curriculum, though the extent to which this is recognised has varied across countries and over time. The arguments for a strong presence must continue to be made. First of all, sport contributes in many ways to learning processes. When pupils play on the playing field, they gain physical strength and learn physical skills, but also develop discipline, confidence, ambition, intellectual strength and creativity and learn to cherish relationships with new people and fellow players. Whatever the sport, the interaction between different children / students helps them to better understand each other and their surroundings. Sport and physical activity can also sharpen minds and help young people to learn a range of other subjects more effectively. Sport, and organised physical activity therefore has a central role in a school's curriculum through its imparting of a range of knowledge and skills. It is especially valuable for those that are less-gifted academically, though not exclusively.

However, the role of sport and organised and unorganised physical activity in schools and universities is changing and its significant potential contribution to the promotion of health through sport and physical activity is getting more attention. The importance of physical activity for both physical and mental health has been underlined in the recent Covid crisis. New meaning has been given to the old phrase 'mens sana in corpore sano'.

That experience will cause physical activity and related areas such as nutrition to have a greater presence in school life and will also influence the type of sport activity offered. The tendency will be to ensure that all pupils or students undertake some form of physical activity rather than focusing on the most talented in a relatively narrow range of sports. This will mean that the offer to pupils and students will have to be extended and provided in a greater range of ways.

This provides opportunities for direct innovation as well as a significant place in the overall promotion of preventative care for health. Over time, it will mean that a greater proportion of the population will have physical activity as a significant element in their lifestyles and this too will increase the scope for the sector.

A second important dimension of this theme relates to the development of sophisticated skills thanks to a "livelong vocational and educational training" in and through sport. In this respect, physical activity contributes to the acquisition of some fundamental skills by any sport practitioner that can be replicated later on in any professional environment. Some clear examples of these skills relate to, for instance, the definition of well-

articulated objectives, the acquired habit of perseverance and resilience or simply the benefits of team work.
All in all, it does appear that a common agenda for sport and physical activity as a means to promote health is emerging, with a number of different elements. At this stage, there is sufficient evidence to say that an agreed research and innovation programme for the sport research and innovation community is possible, with a core theme of sport and physical activity as a vehicle for the transition from healthcare to care for health.

The EPSI community will continue to take an active part in articulating and elaborating this programme further, notably by identifying where the links between current activities can be strengthened and what steps can be taken to address institutional barriers in health systems and in education that are hindering the further development of services and processes that can improve the general health of the population by helping citizens to undertake more exercise and physical activity.

The Economy: Sport innovationto boost business

The second area for an elaboration of a research and innovation programme relates to the multiple ways that sport and physical interact with the commercial side of the economy by stimulating the production of facilities, equipment and apparel and in developing commercial services, often in interaction with related sectors, such as tourism, transport or the building sector involved in the construction or maintenance of sport infrastructures. A major part of sport's interaction with the economy comes in the form of the application of digital technology in a variety of products and services. Indeed, this element is so significant that it will be the focus of a third area for the development of a distinctive research and innovation programme that is considered in the following section. For the moment though, the discussion will examine non-digital elements in the interaction between sport and physical activity and the economy. Generally, 3% of overall gross valued added in the EU, (euro 294.36 billion) is generated by sport and related activities.

Furthermore, this sector appears to be growing and contributing to significantly to employment. For the EU as a whole, total employment generated by sport activities is worth euro 7.3 million and is equivalent to 3.5% of total EU employment .
Sport's on-going associations with business have their own dynamic and give rise to new demands and requirements, sometimes simply for commercial developments, but at other times for reasons of public policy.

Behind these developments, there are on-going technological changes, but also other drivers of innovation - changes in business models and shifts on the demand side. These are steadily changing the requirements of sport producers and the demands on the sport research and innovation community.

Demand-side Drivers

Various aspects of sport and physical activity give rise to requirements for change through their own internal dynamics. Most sports are competitive by nature and participants are continuously seeking ways of improving their own performance. New materials can contribute to this (carbon nanotubes, nano¬composites, shape memory alloys, self-healing polymers, technical textiles, etc.), as can new and improved sport products (shoes, clothes, skis, bikes, boats, rackets, poles, and other equipment) and also new sport nutrition and drinks. For spectator sports, where teams compete with each other and where different sports compete for spectators (either physically on through the media), there is continuous pressure for organisers to improve all aspects

of the spectator experience. A perhaps less obvious area where innovation is stimulated, concerns the response to the need to ensure that rules are properly and fairly applied, not just during sport events (e.g. refereeing), but also in the run-up to and following events (e.g. doping controls). New observation and testing technology and techniques can be therefore stimulated by the demands of this area.

Interest in sport can stimulate growth and development in other areas. Prior to the Covid crisis, sports and activity tourism were fast growing sectors within tourism. More and more tourists are interested either in viewing or participating in sport activities during their visits either as the main objective of travel or as part of a package. Sport events of various kinds and sizes attract tourists as participants or spectators and destinations try to add local flavours to them to distinguish themselves and provide authentic local experiences.

Mega sport events such as the Olympics and World Cups are recognised to provide a very significant economic impact on their host countries, an important part of which is the attraction of tourists, which can be further leveraged in terms of destination branding, infrastructure development and other economic and social benefits.

The rebound from COVID-19, is likely to see a large increase of sport tourism once more, but also an increase in activity tourism, where opportunities for particular kinds of physical activity are the motivation for, or a large element in, decisions about tourism destinations. This too has been a growing sub-sector of tourism and needs its own support and infrastructure, often in relatively remote locations. This too can be an occasion for innovation in all its forms.

A growing emphasis on sport and physical activity in modern lifestyles, referred to in the previous section, helps create a demand for facilities and equipment. It also has a particular interaction with clothing and footwear, over and above that required for undertaking physical activity, in that it influences the sense of style and image, especially of younger people and this is further magnified in advertising and the media. In this way, the sense of lifestyle makes a contribution by generating a sort of media content, to which, as will be seen shortly, there is an important technological response.

Application of Trends in Technology, Manufacturing and Other Sectors

Important general changes in technology allow innovation in the following areas:

a. Nanotechnologies: This molecular level technology gives rise to new materials with many applications in sport equipment and facilities. It can change the landscape of sports.

b. 3D printing: the great advantages of modern 3D printing and modelling technologies is their ability to support customisation and personalisation. This has enabled sports goods manufacturers to develop unique items for athletes that fit their measurements perfectly and utilize the best materials modern technologies have to offer. As a result, the new generation of sports equipment is lighter and better suited to the precise needs of the athlete wearing it. This trend also supports the “reshoring” in Europe of many manufacturing processes with a unquestionable beneficial effect on the global environment especially when it comes to the transportation of goods and products.

c. Continuing development of clothing materials and technology often find their initial applications in sport apparel, not least because of the marketing potential, but also because improved performance of clothing in different and often challenging environments is more critical for sport and other physical

activities than it is in everyday life.
This is an area where Living Labs associated with sport activity and research can be especially effective.

Opportunities for specialised enterprises, including SMEs, continue to arise in construction activities, relating to sport and physical activity, not least as a result of the significant investment required to build new stadiums, arenas, and other forms of sport infrastructure, undertake reno¬vation work or maintenance or increasingly through the need to make sport facilities more sustainable environmentally. Sport generates more than € 3 bn in value-added in the construction sector .

Furthermore, it has been understood for some while that sport facilities and events can contribute significantly to the regeneration of urban areas, but there is also a growing appreciation that sport and physical activity need to be integrated into the planning of any urban landscape and that Green and Vital Cities need to stimulate citizens to engage in more physical activity and incorporate elements promoting health & vitality.

Part of this is the growth of dual or multiple-use facilities, that can allow for sport and/or physical activity, but that can equally be used by the general public for other social, community or commercial activities. These developments provide opportunities, especially for innovative thinking, for those who understand the needs and potential of sport and physical activity.

Advances in technology continue to have impacts on sportswear and equipment, responding to the growing demand referred to above. It is predicted that the value of the sector could rise to around $400bn worldwide by 2025 .
The largest markets for sport articles are the UK, France, Italy, Germany and Spain. These days, most sport articles are manufactured in Asia, but their retailing is significant economically and a lot of the high-value-added activity, such as research, innovation and design takes place in the EU with positive effects for suppliers and employment in the EU. And there is a growth of the production of technical and high-end textiles in locations nearer to where these products are purchased, to the extent that it has become an increasingly vital and dynamic part of the EU textile industry.

Strengthening the innovation ecosystem

The sport sector is an area where there is an especially complex interaction between the public and the private sectors and the boundary between the two can shift considerably from one European country or region to another, but overall, it is indisputable that public authorities can play a very significant role within the development processes characterised by the quadruple helix model as applied to sport and a healthy active lifestyle. At the same time, universities and research institutes have become increasingly active and have drawn in increasing numbers of private enterprises, so that there has been a steady growth of sport-based Quadruple-helix clusters in recent years.

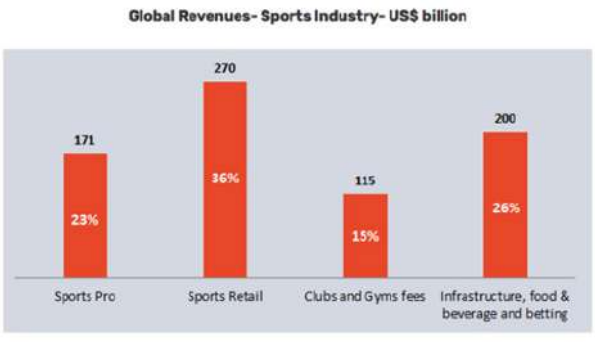
These Q-helix clusters are more and more the basis of the innovation and business creation ecosystems, while also forming the core of (an interregional network of) Innovation Hubs for Sport and Vitality. These ecosystems are built upon regional and cluster ambitions and regional excellences, linking them to achieve a stronger impact in the innovation actions of business and society and at a personal level. EPSI supports Q-helix clusters in strengthening these important developments in the sports & vitality ecosystem. All the innovation systems have 3 things in common: they are data driven (enabled), user centred and evidence based/impact driven.

The evolution of these innovation systems will

continue and will further mould the landscape in which the sport research and innovation community has to operate, building on their excellences and ambitions and motivated by the clear potential for their impact on societal challenges and business opportunities. Partially driven by policy at an EU level, but also following commercial logic, there will be increasing cross-cluster collaboration, often extending to clusters with a focus on related areas such as health, nutrition, information technology and design. All the participants will benefit from a cross-fertilisation of ideas and knowledge arising from a multi sectoral approach. At the same time, there will be a growing internationalisation of cluster members and a growing complexity in supply and value chains.

These developments will need their own kinds of support, not least in the form of better management and enforcement of intellectual property rights. There continue to be major problems in this area. Last year alone, customs officials in the EU seized counterfeit sport shoes worth more than € 36.5 million.

The changes needed to support these developments will include certain institutional elements. Innovation Hubs for Sports & Vitality, providing a locus for support, will continue to grow and as part of the hubs, the at the Living Labs concept will continue to develop. There will also be a need to incorporate more organisations



Source: Sports Value

into the general sport innovation ecosystem that understand the special needs of sport innovators in relation to their access to finance.

The sport research and innovation community will need to adjust to these developments but will also have to strengthen and discipline its own efforts. There is a case for addressing the variable quality and impacts of some of the products that are brought to market by the sport-based industries, including through the development of more extensive standards and testing regimes. This would form part of the development of a more robust set of methodologies that the sector should be able to deploy that would pay more attention to 'Sports Tech Research Impact'. This strengthening of the methodologies applied by the sector would in turn support and reinforce the emergence of more coherent and co-ordinated research programmes and, in particular, would assist on the applications side of the spectrum running from pure science to practical application and commercialisation.

The sport research and innovation community will also, especially when it is working through cluster organisations or building local sport innovation ecosystems, ensure that there is sufficient encouragement of new businesses. Over the last few years, even before Covid -19 struck, the number of sports-related start-ups was not commensurate with the rate of development of the sport sector's growth opportunities.
The economic dimension of sport and physical activity, therefore, offers an almost bewildering variety of opportunities for the sport research and innovation community. This in itself re-enforces the argument for a more systematic mapping of opportunities and the links between them that can help consolidate research and innovation programmes and provide the occasion for the development of more consistent methodologies.

Two research and innovation programmes suggest themselves. The first is in relation to the application of developments in materials science to sport goods and activities. The aim here would be to attempt to make links and promote cross-fertilisation between different areas of materials research and applications, identify gaps in knowledge and experience and promote developments to fill these gaps. This would be an area where the development of robust methodologies, including the development of standards and testing, would be a particularly important element in the programme, especially if a focus on customisation and personalisation is to become a significant theme for the programme.

The second area for a possible research and innovation programme relates to the interaction of sport and physical activity and tourism, especially in the form of activity tourism. Here the innovation required is partially technical, in the development of appropriate equipment, especially for members of the general public who are less skilled than devotees of the particular sport or activity. However, there is also considerable scope for organisational innovation, both in respect to business models for enterprises operating in the sector and also in the provision of support infrastructure and facilities by development authorities that wish to promote activity tourism.

Digital Transformation: Sport innovation to create value with data

For all societies, the Digital Transition continues, though at different rates and its presence in our lives is all pervasive. To maintain the competitiveness of the European economy and ensure that the wide range of benefits from this technology are available to European citizens, the Digital Transition must be actively pursued and this is evident in the changes taking place in a wide range of sporting and related activities. The characterisation of these changes and how they affect the sport community is an important preliminary to articulating a strategy in this area for the sport research and innovation community.

Developments in data gathering, sharing and data usage

Developments in the collection and use of data are now of central importance for the sport sector, especially in relation to sports performance and for use in a variety of media. The scientific assessment of improvement in performance sports has become a major factor in determining their competitive position and there continues to be a development of a range of services based on data analysis. These can be focused at the level of the individual player or provide consistent information for the club, but other organisations are also finding data and performance analysis critical for their operations – from those involved in the media to betting facilities.

But data have much broader applications in sport and related areas and are being used in a whole range of new products and services, from sport simulation to the gamification of products, in the monitoring and planning of sport facilities and supporting the transition from healthcare to care for health. This is

stimulating innovation directly in products and services, but it is also being used to support decision making in policy arenas, in business and the organisation of sport, prompting the development of new business models and providing new opportunities for businesses, including SMEs.

New approaches to the anonymous use of data are helping build confidence in these applications. In addition, data technology is improving the scope for assessing effect and impact, providing feedback on how products and services are used by consumers and also helping firms assess more accurately how well they are selling and in which market segments.

Technological enablers of data exploitation are also developing rapidly and having impacts on the sport sector in a variety of areas. As elsewhere, data mining, machine learning and Artificial Intelligence are all changing existing processes and opening up new possibilities. All of these major developments could make a substantial contribution, for instance, to the transition from healthcare to care for health and the role of sport and physical activity within it.

Exploitation of 5G and further generations of telecoms technology and the extension of the Internet of Things undoubtedly will figure predominantly in new applications in the sport sector, including where these are combined with developments in sensor technology, which has many specific applications in sport and physical activity.

Data mapping and representation too are contributing significantly to effective use of the data being generated and present a range of opportunities, especially for communities close to the application of such developments, such as in various areas of sport.

Gamification offers many possibilities for sport and physical activity and a further particular related application that shows great promise is in the use of digital twins as an important tool in innovation processes, in the creation of new products and services and as the basis for decision making in a wide spectrum of areas. These can be applied at the personal level, where the digitalization of personas can be extended through digital twin technology to mirror personal characteristics to the extent that near perfect individualization can be achieved – supporting a growing trend in sports goods. Equally, they can be used to model physical environments and infrastructures, driving the development of smart venues and smart events and even helping to deliver smart vital cities, or they can contribute to the management of sports clubs. At another level, they can be used in the assessment of the environmental or social impacts of developments.

Responding to Developments

EPSI and its community must respond to digitalisation processes in the sector and especially to the digital technological drivers that are having such an impact. However, in doing so, it is important to reflect on the sport research and innovation community's own positioning in respect to these developments, in order to determine how it can best help to influence the way that its work evolves in the future. EPSI's community is not generally in the position to shape the direction of travel in digital technologies as such. Rather, it tends to be a receiver and exploiter of technology produced elsewhere. Its focus, and its strength, is more on the application of these technologies to improve the physical and commercial performance of individuals and teams engaged in sport and physical activity and to support the management of these activities. In short, rather than initiating developments in basic digital technologies, the community is a user of these technologies, specialising in their applications in sport and

vitality. Furthermore, the model deployed by the community in developing these applications tends to be that of mission- or impact-driven innovation processes, where there is working to concrete targets within an overall challenge in a way that provides a framework and stimulus for the developments that take place.

A central theme in the application work undertaken by the community is performance – the development and provision of products and services monitoring or aiding the performance of individuals and teams across many sports and forms of activity, but also assessments of the performance of these products and services themselves. The two types of performance are intimately related, given the importance of accuracy and serviceability in services and products supporting the performance of individuals and teams.

This area alone provides many opportunities to develop new business, especially through data related services and products. An increasingly important strand among these opportunities is the provision of more personalised products and services and especially those that are able to adapt to the end user's needs, requirements and characteristics, either at an individual level or as part of a community. In this way the products contribute to community building and this in turn provides opportunities for further servicing or simply marketing. Gamification can then add additional sophistication to the nature of the service delivered, but can also have significant impacts on performance, not least by providing an additional motivational dimension.

Other opportunities are provided by the use of data to enable new business models and new forms of delivery, in the form, for instance of Products as a Service (PaaS) or Service as a Product (Saap).
Because of the personal nature of the data generated through performance products and services, there are special issues of data safety and data ownership to be addressed, where advances in techniques have a ready application. Similarly, developments in payment transactions and methods, including in multiple and crypto currencies have particular issues in the sport area. At the same time, with appropriate safeguards, the intelligence and information generated from performance data have considerable value with many potential uses, not least in the medical area and in supporting the shift from healthcare to care for health.

From these considerations, it can be seen that the second strand in the performance area, namely the performance and quality of the products and services being delivered, is very much tied to the enhancing of the performance of individuals and teams, even though its relevance goes way beyond the area with which it is associated in this instance. Data can increasingly be exploited to contribute to performance in this second sense, providing feedback on products and services, assisting with accuracy and helping to measure and assess impact, both in real time and over the long term. Data can also be used to assess conformity with standards and protocols that are also part of developing a robust research and innovation programme.

Furthermore, there can even be significant inputs into strengthening innovation processes in the area, connecting and improving interactions between different parts of the innovation chain / cycle, stretching from the initial identification of needs, through the innovative response, the validation processes and the acceleration of the solution implementation to the assessment of the impact. In an area where the efficacy of the solution is particularly important and where much of the activity of the research and innovation community is concentrated,

these aspects of the technology landscape are of major significance.

The sport research and innovation community driven by EPSI can be expected to make many and varied contributions to the development of the sport and physical activity sector through digital innovation and applications. In particular, it will provide major elements of support to the transition to preventive care for health. It will also assist sport organisations to contribute to the transition to an environmentally sustainable economy and will drive many of the developments in the sport economy. However, an area that is distinctively its own is the contribution to measuring and enhancing performance and we have seen that this has to be understood to include a continuous evolution of highly performant products and services in the sport and physical activity sector. Helping to develop a more co-ordinated and consistent approach to developments in performance goods and services appears to be a priority for the EPSI community.

Climate Change & the Environment: Sport Innovation to support Sustainability

"Sports impact on our climate is complex and can be difficult to measure depending on the size of the organization and/or event. However, most sports organisations and fans would now acknowledge that sport's contribution to climate change – through associated travel, energy use, construction, catering, and so on – is considerable. Moreover, sports' global interest for billions of fans, and the media coverage generated in response, provide a strong platform for the sport sector to play an exemplary role in meeting the challenge of climate change, and inspire and engage large audiences to do the same." (UN Sports for Climate Action Framework)

So, everyone has a role to play when fighting for climate change. Climate change will affect all sports from the elite, international levels to the grassroots, local levels in communities around the world, and disproportionately impact countries that are less developed. However, just as with the other sections of society, all sorts of sport organisation will have to change their habits and practices and examine the facilities that they use to ensure that they are all more sustainable. The issues that have to be faced are not in most cases unique to sport, but sport activities from the staging of events to relatively benign activities, such as individuals walking, running and cycling have to consider their own impact on the environment. The sport research and innovation community is in a good position both to support sport organisations in analysing their environmental impact and in providing solutions.

The Greening of Sport

There is a two-way relationship between sport and the environment. The impact of the environment on sport, and the climate in particular, is palpable and direct in that the climate and the physical environment of a particular place influences the scheduling of sporting events or even if the sport can be played at all. Global Warming has an unmistakable potential to have a long-term negative impact on sports in general and winter sports in particular.

Sport's sustainability movement has grown in line with public consciousness of the need to respond to climate change. Leading organisations at international, European and national levels within the sport sector have positioned themselves to champion environmental sustainability. At times this development has had to fight against the ever-intensifying commercialism which has transformed the contemporary sports management model and let the logic of the market over-rule the social and community values that originally motivated sport clubs and associations. Nonetheless, contemporary capitalism has to pay some attention to the image of its assets and

sport is particularly sensitive to reputational damage, and therefore even the most hard-nosed of sport club owners and associated businesses have to be seen to be responding to social concern on environmental matters.

Plenty of guidance for sports organisations at all levels has been issued ranging from the UN Sports for Climate Action Framework to the 'Environmentally responsible commitments from the managers of large-scale sports facilities and venues' developed by the French government and the Manual of Good Environmental Practices in Sport, published by the Portuguese government.

Initiatives can range from reducing energy consumption in sports facilities or using them to generate renewable energy by installing solar panels on their rooves to using more environment-friendly materials or promoting the Circular Economy through recycling of waste in a wide range of sport goods and events.

The extent of the challenge should not be under-estimated. A 2008 study by researchers at Cardiff University found that the average spectator can generate a carbon footprint of up to seven times greater than the amount caused by going about daily life, since the environmental impact of major sporting events can be considerable in every aspect from the construction of venues to the transportation of people and the power needed for lighting and broadcast facilities.

A particular issue relates to the environmental impact of water-based sports awareness of the threat of pollution of the seas through plastic waste has grown enormously in recent years and has become a huge issue for the fashion industry, for instance, with shoes made from recycled sea plastic. Sports can do a lot to raise awareness of these issues and the need for participants in water-based sports to mitigate the effects of their own activity.

A world of opportunities is behind innovation processes

Research and innovation relating to sport is in the position to be able to make substantial contributions to developing more sustainable processes in the sport world. For instance, new design methods, research on new materials and recycling technology itself can make a significant contribution to establishing circular economy value chains in sports and related areas. This is a relatively complex area but it is one that is changing rapidly and providing innovation opportunities. Tracking the possibilities and promoting co-operation in order to seize them would provide a valuable service for the sport research and innovation community, which can build on existing work in sport clusters and research centres.

The COVID-19 pandemic too is a wake-up call in this context. Our world will never be the same again and neither will our cities. But the crisis may provide an opportunity in the future to build better and more sustainable societies and cities. Cities are centres of innovation and wealth creation, but also hotspots for air and noise pollution, heat island effects and areas deprived of green spaces —all factors detrimental to human health. They are now also hotspots of COVID-19. In a number of cities, novel planning concepts are being introduced that go some way to address the urban planning issues: the compact city, superblocks, the 15- minute city, the car-free city, or a combination of these.

Sport's contribution to a Sustainable Society and Green Transition Processes

As well as the greening of sport's own activities and direct impacts on the environment, sport organisations can contribute to the wider communal effort to affect a green transition. They are in a good position to do so, especially through local initiatives to transform communities. Sports organisations at all levels usually have strong local roots, but small local sport and

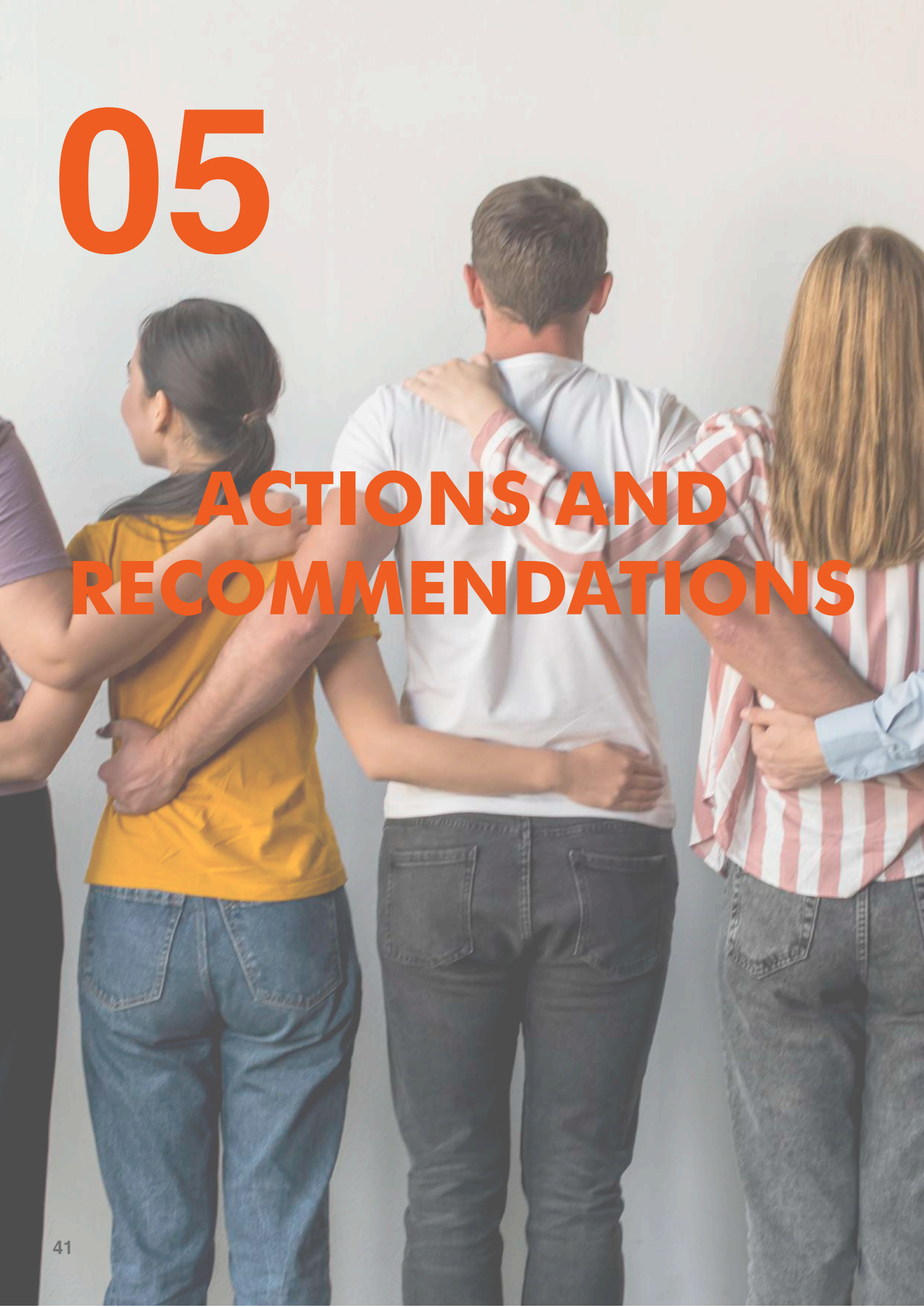
physical activity associations especially are well connected with their local communities through extensive local membership, the involvement of volunteers etc. These organisations are therefore in a good position to contribute to community transition efforts, which will consist of promoting local energy efficiency schemes or the switch to electric vehicles, local sustainable energy generation, local food production and a range of other initiatives. In some of these schemes, sport associations and clubs could well do with technical assistance from the sport research and innovation community.

Sport will also be contributing to the Covid-19 recovery, not least through the re-launching of sport events, the opening up of gyms and sport facilities etc. This presents an opportunity to do things in a new way and in particular to contribute to green transition both through the greening of sport organisations' own activities and facilities and through wider interaction with the community. But central to this will be ensuring that the benefits that sport and physical activity can bring are maximised and spread as widely as possible within communities to include people from divergent backgrounds, thus making a significant contribution to mobilising society to face health threats and tackle wider social and environmental issues, including the transition from a healthcare to a preventive care for health system.

The relationship between sport and both the physical environment and its extension into the social environment provide scope for the development of research programmes and a range of research and innovation projects for the sport research and innovation community. The challenge, of course is to articulate these clearly and align them with policy trends, but it should be possible to review the main areas where the greening of sport has to take place. These areas have already largely been identified. The review would then go on to identify those areas where the sport research and innovation community can make the greatest contribution to supporting and implementing the processes involved. It would then be a matter of developing a consistent approach to addressing these areas and encouraging the sport research and innovation community to articulate priorities.

05

ACTIONS AND RECOMMENDATIONS



As EPSI, its members and the broader sport & vitality research and innovation community (including the neighbouring sectors) move forward into the new programming period, EPSI's new Strategic Research & Innovation Agenda needs to have both coherence and ambition to be able to support the true potential of the sector effectively and allow it to respond to the opportunities and challenges that have been outlined in previous sections. .

An important consideration is that the new Strategy needs to align itself with the priorities and implementation processes of the new policy and research frameworks so that it develops with the grain rather than attempting to cut across it. Moreover, EPSI has to be at the forefront of any innovation processes that bring to the market the products and the services of the future. However, in doing this, EPSI and its members should also recognise that they are well positioned at an important intersection in the research and innovation landscape between active research and its application in a range of innovative products, services and processes. It is therefore in a position to take a leading role in contributing to and developing the efforts of the whole sport research and innovation community.

Consequently, it is proposed that the following represent the main elements of the EPSI Strategic Research & Innovation Agenda for the period 2021 to 2027.

ACTIVATE THE COMMUNITY

- EPSI and its members should help the sport research and innovation community move from inspiring but isolated projects to the development of more substantial and consistent, overarching research and innovation programmes that make a much greater impact.
- EPSI and its members should equally inspire and enrich the sport business creation dimension by boosting the creation of new companies and spin-offs, promoting commercial ventures through dedicated incubator or accelerator schemes and helping to build support for entrepreneurship within the sport ecosystem.
- To this end, it should promote the detailed articulation of specific research and innovation programmes that both address the broad themes arising in the main areas where sport research and innovation can respond to social, technical and commercial challenges facing European societies and do so in a way that maximises their chance of receiving adequate funding.

RESPOND TO SOCIETAL CHALLENGES

- In particular, an early priority ought to be a research and innovation programme to support and help implement the transition from healthcare to care for health. This should be followed progressively by the elaboration of the other main research and innovation programmes identified in this paper.
- In order to reinforce this new thrust in its research and innovation agenda, EPSI and its members should successively develop detailed characterisations of each specific research and innovation programme, setting out the challenges and needs to be met and the policy and business contexts, the key themes of the programme, the range of solutions to be sought, the processes and instrumentation to be developed and the partners and networks to be involved.
- EPSI and its members should also make major contributions to developing the methodologies deployed in its area, in order to make research more effective and ensure that innovation processes lead to high quality results. This could include the elaboration of procedural and

other standards and the development of testing procedures and facilities.

CONNECT AND CREATE CROSS-OVERS

- To assist in these processes, EPSI should consult and work with other parties active in the sport research and innovation community, especially at a European level, including:
- International Council of Sport Science and Physical Education (ICSSPE)
- Association Internationale des Ecoles Supérieures d'Education Physique
- European Association for Sport Management
- European College of Sport Science
- European Federation of Sports Medicine Associations
- European Association for Sociology of Sport
- Sport and the European Union
- It should also work and create cross-overs with related sectors, such as smart systems, ICT, health, nutrition, textiles and apparel and tourism, just to name a few, in developing research and innovation programmes.

STRENGTHEN THE RESEARCH AND INNOVATION ECOSYSTEM

- In elaborating the research and innovation agenda, it should actively aim to promote development of the European Research Area in the field of sport research and innovation and help articulate ERA priorities for the sector.
- To this end, EPSI should promote the development of research excellence and its effective translation into practical and commercial applications and it should seek to assist the development / deployment of joint programming across countries, the free circulation of knowledge, the mobility of academics and students and the development and sharing of R&D facilities and infrastructure and digital access services.
- EPSI should build on and further develop regional excellences and ambitions and, its work with Q-helix innovation clusters, further promoting the concept of Living Labs and contributing to the development of innovation ecosystems, including by forming a European network of Innovation Hubs for Sport and Active healthy lifestyle.

SUPPORT MEMBERS and IMPLEMENTATION ROAD MAP

- EPSI should continue to develop its work in supporting members who are writing and submitting research and innovation proposals through the list of "Concept Notes", as they are known, especially for EU funding, including by developing tools to assist in the preparation of any proposals.
- So as to ensure a factual and up to date operational implementation of any tangible objectives related to this SRIA, reflecting the evolution of the times, EPSI will elaborate, as a separate paper, a periodical, annual "implementation road map" with both quantitative and qualitative Key Performance Indicators. The completion and realisation of these KPIs will enable a clear impact assessment to be made.

CONCLUSIONS

The EPSI Strategic Research & Innovation Agenda 2021 – 2027 is providing a basis for the research and innovation community that focuses on sport, physical activity, active healthy lifestyle and related areas.

The community is faced with new challenges, to which they need to respond with a step change in the sophistication with which they carry out their activities. In particular, the sport research and innovation community need to move from interesting but isolated projects to develop much more systematic and co-ordinated research and innovation programmes in four key dimensions of its current activity:

1. Health, the Individual & Society;
2. The Economy;
3. Digital Transformation;
4. Climate Change & the Environment.

This strategy document has explained the challenges being faced by the EPSI community and has outlined how the necessary responses can be developed over the next period. As a result, there is the prospect of an exciting new period in the development of EPSI and its members that will raise the output and performance of their research and innovation and considerably enhance its status:
The SRIA can be seen as a call for action for all the EPSI community and the broader stakeholder group of private and public partners as well, encouraging them to unite their efforts, so as both to tackle the challenges and harvest the opportunities

Editorial team

Antonello Marega - EPSI
Alberto Bichi - EPSI
Rene Wijlens - EPSI/Cluster Sports & Technology
Sebastiano Lommi - EPSI
Marc Van der Zande - Cluster Sports & Technology
Steve Haake - SHU
Enrique Alcantara - IBV
Jan Willekens - BDO
Mike Coyne - Supervisor/ Editor
Kristof De Mey - Victoris, Ghent University

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