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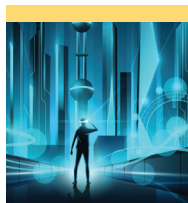
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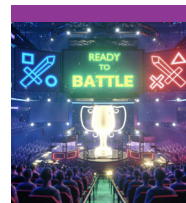
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myForesight® is pioneering a national level foresight initiative to facilitate technology prospecting for local businesses. myForesight® advises and provides a common platform for the government, industry and academia to share experience, insights and expertise on 'futures' strategy, both locally and at a larger global level.

Key components of myForesight's mission are intelligence, research, competency framework and community engagement. **myForesight®** raison d'être is set out to accomplish the following:

1. Anticipate Malaysia's future possibilities;
2. Promote foresighting at national, sectoral and corporate levels;
3. Identify key technologies to support sectoral development;
4. Outline key future R&D areas.



Rushdi Abdul Rahim
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Initial Thoughts

Earlier this month, I was having a conversation with some friends over coffee. What started as a conversation about our favourite English Premier League (EPL) team, morphed into other sports in general and the future of sports. Since the coffee session was at a golf driving range, the conversation then turned to how golf has changed due to technology and its impact on golf course design, equipment, the athlete and more.

If we take this conversation and expand it further - what will be the future of sports with the impact of evolving technology?

I believe technology is an enabler and to understand the future of sports, there is a need to understand what drives sports popularity, and how it attracts multiple reactions and emotions. They are popular for a variety of reasons, stemming from their ability to capture human interest and engagement on multiple levels.

Here are some key factors that drive sports popularity:



Entertainment and thrills

Sports offer a blend of excitement, competition and unpredictability. The uncertainty surrounding the outcome of games creates suspense and keeps fans engaged. Who would have thought the Brazil football team would be beaten 7-1 at home during the 2014 FIFA World Cup?



Germany humiliate hosts Brazil in remarkable rout

Brazil 1 Germany 7: One of the most stunning results in history of the game

GERMANY belittled their way into the World Cup final as they thrashed Brazil 7-1 in the final match of the tournament on Sunday night in Rio de Janeiro. Without captain Thiago Silva and without Neymar, the Brazilians were destroyed by a machine of German attack.



EXCLUSIVE Brazil's coach Dunga says his team were 'out of sync' after the rout. He says the team were 'out of sync' after the rout. He says the team were 'out of sync' after the rout.

Guinness to sponsor the Pro12 league

GUINNESS has announced it will sponsor the Pro12 league from next season.

GUINNESS has announced it will sponsor the Pro12 league from next season. The deal is worth £10m per year over three years.

Farah out of Glasgow race

BEHIND her final bid to win the Glasgow race, Farah has been ruled out of the event due to a knee injury.



Human nature and competition

We are naturally inclined towards competition and sports provide a structured and socially acceptable way to channel this competitive energy, both as participants and spectators.



Emotional connection

People often form emotional bonds with their favourite teams or athletes. The ups and downs of an athlete or a team's performance can evoke a wide range of emotions, fostering a strong sense of belonging and community.



Escape and distraction

Sports also offer a way to unwind and relax. For many, watching or playing sports is a form of distraction that allows them to temporarily forget about their own challenges and immerse themselves in the game.



Skill and achievement

As a fan or spectators, we admire the skill, athleticism and dedication displayed by athletes at the highest levels. Witnessing exceptional talent and athletes achieve remarkable feats can be awe-inspiring. Were we not amazed by Cameron Spencer's photograph of Usain Bolt sprinting himself to a gold medal at the Rio de Janeiro Summer Olympic Games?



Media coverage and marketing

The media plays a significant role in promoting and covering sports events. Extensive range through television, radio, online streaming and social media ensures that sports are accessible to a broad audience.



Culture and tradition

Many sports have deep-rooted cultural significance and historical traditions. They can serve to preserve and celebrate cultural heritage, uniting generations and communities over common pastimes. The Haka dance performed before the start of the New Zealand rugby team is an example.



Storytelling and narratives

Sports are full of narratives and stories that capture the imagination. Underdog tales, comebacks and rivalries create compelling storylines that resonate with audiences and keep them invested. Remember Linsanity in 2012?



Social interaction

Sports create opportunities for social interaction as fans and spectators gather to watch games together, discuss strategies, celebrate victories and lament defeat. This shared experience helps people connect with others who share similar interests. Just look at a *mamak* shop during a live telecast of a major sporting event.

Health and fitness

Sports promote physical fitness and healthy lifestyles. Many people engage in sports either as participants or spectators to support a healthy way of life and appreciate athleticism. This sense of living a healthy lifestyle has fed the growth of the sports equipment industry. Revenue in the Sports Equipment market amounts to US\$160.90billion in 2023. The market is expected to grow annually by 6%.



National pride and identity

International sports events like the Olympics and FIFA World Cup evoke a sense of national pride and unity. People rally around their national teams, showcasing their country's abilities on a global stage. Malaysians are proud of Nicole David's reign as squash world number 1 for an unprecedented 9 years.

Therefore, the popularity of sports can be attributed to the emotional, social, physical and cultural connections they create. They are a platform for human expression, competition and social interaction that resonates with people across the world.

So, where does technology come in? As a start, technology has been complementary in driving the changes in how sports are being conducted, enjoyed and consumed. Therefore, the future of sports technology will likely be both transformative and exciting, as technology continues to advance and integrate into various aspects of the sports industry.

Here are some key trends and potential developments in the intersection of technology and sports:



Data analytics and performance tracking

Advanced data analytics and wearable technology are already revolutionising athletes' training and performance. In the future, real-time data collection and analysis will become even more precise, helping athletes and coaches optimise training, prevent injuries and enhance performance. Biometric sensors, GPS tracking and other wearable devices will provide valuable insights into an athlete's physical and physiological state.



Virtual and augmented reality (VR/AR)

VR and AR technologies can potentially transform the fan experience and sports consumption in general. Fans could enjoy immersive experiences, such as watching games from different camera angles or even virtually stepping onto the field. Athletes might use VR to simulate game scenarios for practice or rehabilitation.



Esports and virtual sports

Esports and virtual sports are gaining popularity and their integration into the mainstream sports industry is likely to continue. Esports events draw massive online audiences, and traditional sports teams and organisations are investing in esports franchises.



5G connectivity, smart venues and fan engagement

The rollout of 5G networks will significantly enhance connectivity and data transfer speeds. This will enable real-time streaming, instant data sharing and seamless integration of technology in sports venues - benefiting athletes, coaches and spectators. The connectivity will enable sports venues to be "smarter" and more connected. Fans can expect personalised experiences through mobile apps, interactive displays, and augmented reality features, enhancing their engagement during games.



Artificial intelligence (AI) and machine learning

AI can be used to predict game outcomes, analyse player strategies and simulate game scenarios. The sports betting industry worth USD242 billion, will be a significant beneficiary of this development. However, this technology could also be used for training and athlete development, where AI-driven coaching tools could provide insights and suggestions to coaches and players, helping them make more informed decisions.



Biomechanics, materials and equipment innovation

Technology will continue to play a role in designing and improving sports equipment - pushing the boundaries of athletes' performance as well as making it easier for the next-door sports enthusiast to play them. From high-tech running shoes to aerodynamic cycling gear, innovations will aid both athletes and athletes' wannabes in their pursuit of peak performance.



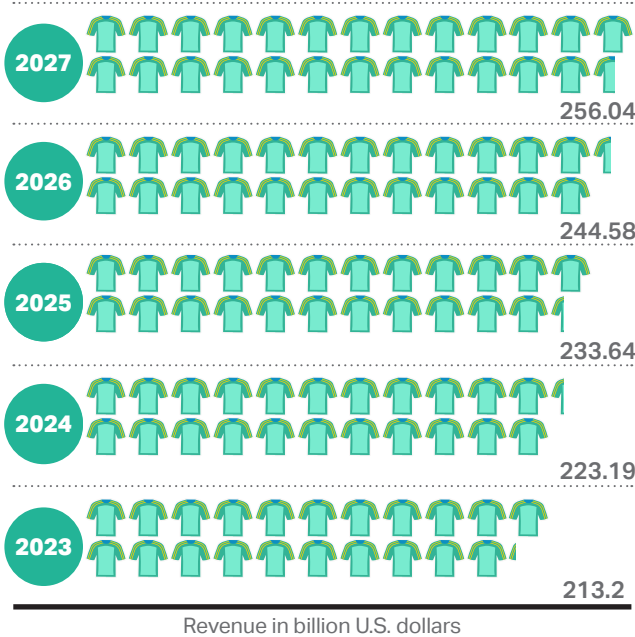
Longevity and injury Prevention

Technology will play a crucial role in monitoring and preventing injuries as well as prolonging the careers of athletes. Innovations in nutrition, lifestyle as well as protective gear and impact-sensing technology can help minimise risks for athletes.

These trends and possibilities represent only a fraction of the potential ways technology will shape the future of sports. The continuous evolution of technology will undoubtedly lead to innovative breakthroughs that reshape how sports are played, watched and experienced by athletes and fans alike. This continued interest has driven the growth of the sports industry from USD486 billion in 2022 to USD512 billion in 2023.

Forecast revenue of the global sports apparel market from 2023 to 2027 (in billion U.S. dollars)

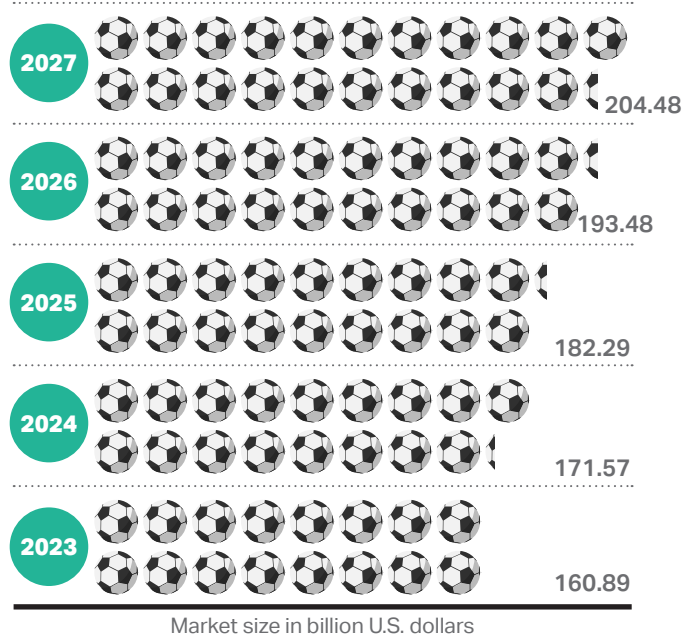
Total revenue of the global sports apparel market 2023-2027



Note(s): Worldwide; 2023
Source: Statista; Research and Markets

Revenue of the sports equipment market worldwide from 2023 to 2027 (in billion U.S. dollars)

Revenue of the sports equipment industry worldwide 2023-2027



Note(s): Worldwide; 2014 to 2027
Source: Statista Consumers Market Insights

We have prepared for you several insights and viewpoints on the future of sports in this current edition. I hope what is presented in this magazine will continue to be of interest to you and add value to the work you are doing. We welcome any content contributions, either in the form of viewpoints or insights you would like to share. Of course, comments are also welcome.

Do reach out to us look forward to hearing your thoughts on these matters.

RUSHDI ABDUL RAHIM



From the desk of...

Datuk Dr. Mohd Yusoff Sulaiman

President and Chief Executive Officer,
Malaysian Industry-Government Group for High Technology

Harnessing Science, Technology and Innovation in the World of Sports

Sports Ecosystem: The Role of STI in Policy and Governance

Let me begin with a personal anecdote. During my childhood in Singapore, my friends and I engaged in friendly races to determine the fastest among us. What started as casual fun took a turn when my brother and I fashioned tiny trophies from aluminium foil. Suddenly, a lighthearted competition transformed into a determined effort to claim these mini accolades. Our approach to the race shifted, from our choice of footwear to the positioning of our bodies and the intensity of our arm swings. These minor tokens ignited a fiery competitiveness that altered the way we approached the races.

This reflects the essence of sports—how the simplest elements can drive performance and determination. It parallels the modern landscape of sports, where Science, Technology and Innovation (STI) have intertwined with the multi-billion dollar industry. Performance is now paramount, and the role of STI has become indispensable in ensuring victory. Empirically, everyone possesses the potential for athletic prowess, but nurturing and cultivating this talent into champions requires harnessing the power of STI. Understanding the body, equipment, environment and infrastructure has become the bedrock of a winning formula.

In this modern era, sports analytics and sports sciences stand shoulder to shoulder with athletes themselves. The fusion of these disciplines enhances the prospects of victory for both individuals and teams. Yet, there's a broader scope to consider—STI governance and policy. It extends beyond the individual to the culture and society surrounding sports. How a community embraces and supports sports is pivotal. Not just creating one champion, but fostering a continual stream of skilled athletes is the goal.

Furthermore, resource allocation plays a substantial role. The more resources dedicated, the greater the potential for

heightened competition. The fusion of STI with the ethos of sports not only fuels success today but also lays the groundwork for an enduring legacy of athletic excellence. In summary, from childhood races to professional competitions, the marriage of STI and sports has evolved from aluminium foil trophies to an indispensable force propelling individuals and teams towards victory. This evolution signifies that a comprehensive STI approach has shifted from optional to imperative, a transformation that ensures the future of sports is one of unprecedented potential and achievement.

Beyond the Adrenaline of the Race

Taking Formula One as an example, I believe Malaysia holds a unique vantage point due to our experience in hosting the event in the past. Reflecting on that, we realize the significance of the roaring sound and the electric atmosphere of a sports event that unites people. Communal activities like sports events are invaluable, and we see their impact amplified when they're absent. The absence of Formula One is a reminder of the richness it brought to our lives, not just in terms of the event itself but in its wider implications.

The influence of Formula One extends well beyond the confines of the racetrack. Formula One holds a unique significance as a testing ground for cutting-edge technology within the automotive industry. It intersects with technology, innovation and automotive excellence. It symbolises the pinnacle of achievement in the automotive industry. Within Formula One, innovations are rigorously tested under the most demanding conditions, setting the stage for advancements that cascade into everyday vehicles.

Yet Formula One is more than a testbed for technology—it's an ecosystem that nurtures collaboration and cross-disciplinary learning. The automotive industry, material sciences, electronics and more converge, creating an



environment conducive to innovation. It has a remarkable capacity to bring together diverse industries, fostering collaborations that extends well beyond the confines of the racetrack. The knowledge and expertise exchanged in such environments can catalyse progress across various sectors.

Moreover, Formula One's multidisciplinary nature has fostered an ecosystem that go beyond industries. It has spurred collaborations across diverse fields, from electrical engineering to material sciences, resulting in an interconnected network of innovation. This collaborative principle is shown by supply chain hubs that have emerged in the Formula One's wake, such as Silverstone, where components are sourced and shared, reinforcing a culture of innovation.

The technology and materials employed in Formula One, such as advanced composites, have found applications far beyond racing, permeating fields as diverse as sports and industry. Electronic sensors, heavily showcased in Formula One, has been widely applied in common vehicles, enhancing their performance and safety features.

The influence cascades even to lubricant technology, exemplified by PETRONAS' engagement in organising and participating in the event. The lubricants developed and tested in the demanding environment of Formula One have earned a reputation that extends well beyond the racetrack. Notably, the performance of these lubricants in a Formula One setting has translated into a mark of quality and reliability for regular passenger vehicles.

An intriguing symbiosis emerges, illustrated by the partnership between the automotive sector and our national petroleum company. This collaboration has resulted in the development of lubricants that not only meet the demands of Formula One but have also raised the bar for quality in general automotive usage. Moreover, the co-creation of engine technologies, a testament to this synergy, underscores the tangible outcomes that emanate from such collaborations.

The aspiration to bring Formula One back to Malaysian soil resonates with a larger ambition—to empower Malaysians with an active stake in the realm of cutting-edge automotive technology. It is about more than just the race; it is about embracing a dynamic ecosystem that cultivates innovation, nurtures partnerships and positions Malaysia at the forefront of technological prowess. This synergy culminates in a strong, integrated team approach, mirroring the racetrack dynamics.

In essence, Formula One exemplifies a holistic ecosystem where STI converges with sports, creating ripples that extend well beyond the track. It fuels innovation, triggers multidisciplinary collaborations and serves as a conduit for co-creating cutting-edge technologies. The prospect of hosting Formula One once more carry significance beyond the event itself; it signifies Malaysia's commitment to embracing innovation, driving technological advancement and positioning itself on the global stage of high-performance automotive excellence. It is not merely a decision about an event, but a choice to propel the nation into a future of limitless technological possibilities.

Using Sports Insights to Fight Pandemics - Where Data Meets Resilience

Beyond the immediate challenges posed by the recent pandemic, there lies a broader understanding of how human bodies respond to structured diseases. Preparing for future pandemics involves understanding how our bodies react to new viruses. This is where the intersection of sports and science becomes particularly relevant. Sports science delves into the intricate workings of the human body, examining its responses to various stimuli like diet, exercise and environmental factors, all with the goal of optimising performance.

The scientific approach in sports extends to genetics, dietetics and various other scientific elements. It is fascinating to note that in the United States, sports are deeply intertwined with statistics. During games, you'll often see detailed statistics displayed - the distance a player runs, the number of shots taken, successes, failures and much more. These statistics offer a microscopic view of an athlete's performance, analysing every aspect inch by inch. This data collection is not limited to just games; it extends to training and various treatments.

Much like the meticulous data generated in sports, the same principle applies to understanding how the human body responds to pandemics. Vaccines are developed based on how our bodies react to these situations. The correlation between sports analytics and pandemic response becomes evident. The data characterising the human body's responses, including genetic reactions to food and exercise, becomes a valuable resource in fighting future pandemics.

However, it is not only the physical aspect; psychology also plays a pivotal role. The mental strength of athletes, determining whether they win or lose, is akin to the first line of defence in confronting a pandemic. A psychologically strong individual is less susceptible to the virus' initial impact. Moreover, the communal aspect of sports is critical. The unity and shared objectives witnessed in sports communities can be applied to pandemic responses. Communities come together to combat a common adversary, whether through lockdowns, mask-wearing or other measures to safeguard not only themselves but also others.

Sports, once a mere competition, has evolved into a business, driving individuals and nations to compete for economic benefits. This evolution strongly involves STI to optimise performance based on unique strengths and capabilities. In the long run, a healthy and united society is better equipped to confront pandemics and thrive in socioeconomic races. Sports, therefore, play a pivotal role in a nation's socioeconomic development.

Conclusion

As we delve into the realm of sports and its intersection with Science, Technology and Innovation, we find a landscape that extends far beyond the boundaries of the playing field. The amplification of the sports ecosystem often requires substantial investments, driven by a pursuit of tangible returns. These returns may manifest as financial gains or, on a broader scale, as societal benefits.

Consider, for example, the expansion of sports facilities. It prompts us to contemplate how we can encourage greater participation, ensuring that more individuals actively engage in sports. This becomes increasingly crucial as younger generations increasingly gravitate towards online and internet-based gaming. In response, we must strategically shift our focus to encourage outdoor activities, embrace fresh air and foster social interactions.

Yet, the influence of sports stretches beyond the arena itself. My own childhood experiences are a testament to this. The hours spent competing outdoors not only promoted physical activity but also nurtured social interaction and a healthy lifestyle. These interactions, in turn, influenced societal trends and shaped economic activities. By cultivating a culture that encourages outdoor sports, we set in motion a positive ripple effect that benefits individuals, communities, businesses and the broader economy.

So, as we peer into the future, let us not forget the enduring impact of sports. It's not just a game; it's a catalyst for change that reaches into every corner of our lives. It's an avenue through which STI, when harnessed effectively, can drive innovation and progress, both on and off the field. Together, let us continue to champion the power of sports to unite, inspire and transform societies.

IN PERSON WITH

Beyond Gaming: Mapping Out Malaysia's Esports Future



Mohan Low

Director,

Digital Content Development, MDEC

Mohan Low has over 20 years of experience in the digital content space, leading teams across games development, publishing and industry building, and not a stranger to the local digital industry. His visionary leadership and deep understanding of the digital realm has propelled him to the forefront of Malaysia's digital transformation journey. He is currently the Director of Digital Creative Content at MDEC, where his role is to drive the development of Malaysia's digital creative content industry focusing on games, animation and virtual experiences. Over 30 game titles were launched throughout his tenure at MDEC. His passion has led him to mentor over a 100 game projects and dozens of gaming startups, as well as organise countless gaming culture events. He is currently working towards building Malaysia as a regional digital content hub, and via an interview with myForesight®, below are Mohan Low's own words on his journey, insights and aspirations for the future Malaysia's Esports.

The market and ecosystem for sports+entertainment has exploded in the era of digitalisation, social media, online engagements, consumer demand and even cultural activism. Growing connections to commerce, music, movies and TV shows have reaped tremendous benefits for numerous industries. This includes esports, with vast potential that can span across platforms for skills development, content creation, entrepreneurship and community building, amongst others. Through strategic collaborations with industry stakeholders, educational institutions and esports organisations, this new and ever-changing sports environment cultivates and fosters talent, empowers aspiring gamers, and is able to position Malaysia as a regional esports powerhouse.

Begin the Battle

Over the past ten years, esports in Malaysia has experienced remarkable growth and development, propelling the country to its current position as a prominent location for competitive gaming. One of the most significant milestones was the recognition of esports as a legitimate competitive activity by the Ministry of Youth and Sports in 2017. This recognition led to increased government support, paving the way for additional infrastructure, funding and resources dedicated to the growth of esports in Malaysia.

As a result, esports has become increasingly popular among younger generations, driving the industry to new heights. Malaysia's inclusion of esports as official games in events like the SEA Games and Asian Games has also added prestige to the sport, further boosting its appeal.

Mobile esports, in particular, has witnessed substantial growth, thanks to popular games such as Mobile Legends: Bang Bang and PUBG Mobile. The rise of professional esports teams and the influx of corporate sponsorships have also contributed to the industry's skyrocketing success, gaining international recognition.

MDEC's role in implementing groundbreaking programmes and initiatives, has been crucial. By developing grassroots programmes for aspiring gamers, supporting professional teams and creating world-class esports infrastructure, we have played a vital role in nurturing local talent, attracting international events and establishing Malaysia as a hub for esports excellence.

With these combined efforts, the esports ecosystem in Malaysia is thriving, and the nation has seen a surge in the number of active esports users. More importantly, our endeavours managed to attract substantial Esports Foreign Direct Investment (FDI), such as the USD10 million investment from Galaxy Racers in 2022, translating into more jobs and industry growth, further solidifying Malaysia's position in the global esports landscape.

To further fuel the esports excitement, MDEC conducted numerous programmes to support the ecosystem, such as featuring esports competitions in our major events such as Malaysia Digital Content Festival and MDEC Shoutcasting Challenge for high school students.

Shoutcasting is the running commentary of esports matches that is intended to both entertain and inform the viewer. It is a crucial part of what makes esports so engaging.



Mining the Craft

For the past 27 years, MDEC has been leading the development of Malaysia's digital economy, through the following efforts:

- Driving digital adoption among businesses and the people;
- Supporting local tech enterprises, talents and technopreneurs to compete globally; and
- Attracting high-value digital investments and global tech giants to Malaysia.

We have catalysed digital transformation and growth all over the nation. By offering greater incentives and governance for growth and re-investment, we aspire to bolster Malaysia's status as the digital hub of ASEAN, opening new doors and driving shared prosperity for all Malaysians.

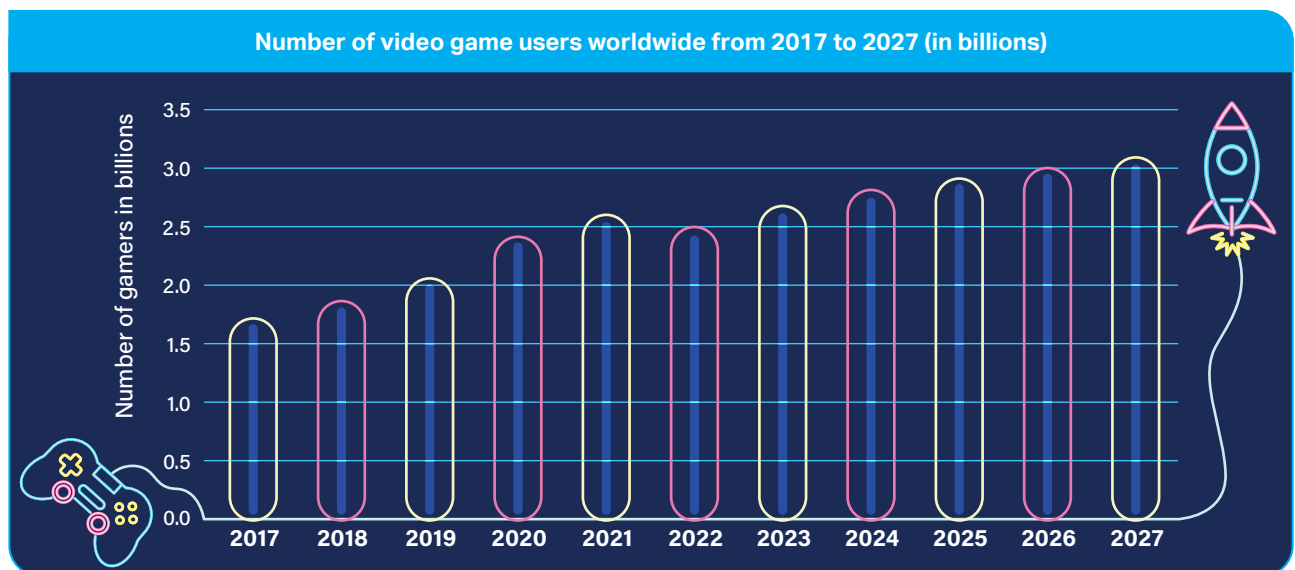
At MDEC, our mandate is to drive the digital economy and accelerate Malaysia's digital transformation. Through

initiatives like Malaysia Digital (MD), we are committed to creating a digital ecosystem that nurtures innovation, empowers businesses and enables digital inclusion.

With a new and enhanced framework, MD seeks to transform the nation's digital capabilities and boost the digital economy via the introduction and execution of various MD Catalytic Programmes (PEMANGKIN). PEMANGKIN will attract RM1 billion digital investments and create 49,000 digital job opportunities by 2025.

Under MD, we have identified nine technology focus sectors with high growth potential, traversing digital trade, digital agriculture, digital services, digital cities, digital health, digital finance, digital content, digital tourism and the Islamic digital economy.

Esports fall under digital content. A report by Statista indicated that by 2027, the number of active esports users is expected to reach 6.48 million by 2027, possibly due to accessibility to egames via PCs or smartphones.



Source: Statista, 2023

Hence, it is only logical that MDEC through MD pays enough attention to the industry and this is done primarily via this two-prong efforts:

- **Infrastructure and Facility Support:** MDEC supports the establishment of esports companies in Malaysia in all areas, be it in facilitating training facilities, gaming hubs and esports arenas across the country. These companies provide esports enthusiasts and professionals with the necessary infrastructure and resources to practice, compete and showcase their skills, creating a conducive environment for talent development. Some of companies MDEC facilitated was ESL Gaming Malaysia and Dynasty Esports.
- **Industry Collaborations:** MDEC facilitates collaborations between various stakeholders in the industry, including game developers, tournament organisers, sponsors and content creators. This collaborative approach enhances the overall esports ecosystem in Malaysia, promotes investment opportunities and attracts international esports events to the country.

IN PERSON WITH

Our youngsters are also not overlooked. In 2021, MDEC organised a Shoutcasting Challenge for high school students, offering training by professional esports casters to those eager to learn the art of shoutcasting. The top students were granted the opportunity to shoutcast MPL tournaments in Malaysia alongside seasoned professionals, and the winner, Syed "Sunfrost" Fitri Abharshah, has since achieved remarkable success as a renowned shoutcaster and influential TikTok content creator.

We also draw valuable insights from success stories and best practices of countries like South Korea, China and Sweden, which have demonstrated exceptional progress in their esports development. By studying their comprehensive strategies, such as dedicated esports leagues, financial incentives and integrating esports into education, Malaysia can adapt relevant approaches to foster our own thriving esports ecosystem. Embracing these lessons will enable us to position ourselves as a competitive force in the global esports landscape.

Growing the Game

Next on our plate is pursuing industry growth and investments. MDEC would be keen to work towards attracting both local and international investments in the overall games industry, including the esports industry. By fostering favourable business environments and supporting esports startups and organisations, Malaysia could become a regional hub for esports events, tournaments and content creation.

The plausible future of games development industry in Malaysia, positions the nation as a prominent digital content powerhouse on the global landscape. With a thriving esports ecosystem, Malaysia could produce internationally recognised esports teams and players, attracting major events and leagues to its shores.

Our expertise in game development, animation and creative technologies would contribute to creating high-quality esports content and innovative gaming experiences. As thought leaders, Malaysian esports professionals and organisations could shape industry discussions and drive innovations in the esports sector.

However, it is also important to address the unintended consequences of this growth proactively.

- 1. Player Well-being:** As esports gains prominence, ensuring the physical and mental well-being of esports athletes becomes essential. Measures such as access to healthcare services, mental health support and promoting healthy gaming habits are extremely crucial.
- 2. Inclusivity and Diversity:** To maintain a healthy and thriving ecosystem, Malaysia must foster an inclusive environment that encourages participation from diverse backgrounds, including gender, ethnicity and socioeconomic status. Thus, addressing gender disparity is necessary to provide equal opportunities for all.
- 3. Regulatory Framework:** As the esports industry evolves, comprehensive regulations and policies would be needed to govern player contracts, team management, intellectual property rights and fair competition. A transparent and fair regulatory framework is vital for the integrity and sustainability of the esports ecosystem.
- 4. Cybersecurity and Ethics:** With the increasing reliance on digital platforms and online competitions, cybersecurity threats and ethical challenges may arise. Hence, it is essential to prioritise cybersecurity measures, protecting player and fan privacy, as well as establishing ethical guidelines for esports organisations and content creators.

By addressing these challenges, Malaysia can ensure a sustainable and responsible growth of its esports industry, maximising the benefits while mitigating the risks. This way, the nation can continue to thrive as a leading player in the global esports arena.

The plausible future of games development industry in Malaysia, positions the nation as a prominent digital content powerhouse on the global landscape. With a thriving esports ecosystem, Malaysia could produce internationally recognised esports teams and players, attracting major events and leagues to its shores.



Liz Alexander, PhD
Futurist. Author. Consultant. Speaker.

Dr. Liz Alexander has been named one of the world's top female futurists. She combines futures thinking with over 30 years' communications expertise to produce publications that showcase the advice of fellow futurists on issues, including the future of education and how businesses can practically benefit from working with the futures community.

Dr. Liz is the author/co-author of 22 non-fiction books published worldwide that have reached a million global readers. She has contributed to leading US technology magazine Fast Company and also Psychology Today, and her work has been featured in journals such as Knowledge Futures and World Futures Review. She earned her PhD in Educational Psychology at the University of Texas, Austin.

The Seedier Side of Sports

Are the economic benefits worth it?

As a child I watched my Scottish grandfather filling in the Littlewoods Pools coupons every week, marking the columns alongside Saturday's football matches with 1, 2 or X to signify whether he thought the result would be a home win, an away win, or a draw. I imagined he must have gotten some pleasure out of doing this because, as far as I remember, he never seemed to win. In adulthood, I saw people in Las Vegas (a place I loathe but which has always been popular with US conference organisers, sadly), who would slot coins or worse, their credit cards into machines, pull the levers robotically and stare at the rolling reels without blinking. I do not know why, but gambling in all its forms has never appealed to me. That includes buying lottery tickets, mindful of the old adage that it is a tax on the mathematically challenged.

Gambling has been around since the dawn of time. In ancient Rome, attendees would place wagers on their favourite gladiators or the result of an upcoming chariot race. During the Han Dynasty of ancient China, the invention of 'kickball' to entertain soldiers led to the 'first recorded soccer gambling, whereby spectators could enjoy wagering a small sum on the results of the game. Even then, restrictions were required, to stop gambling from becoming an obsession. Egyptian scripts believed to be over 6,000 years old, spelled out how laws had to be written to control the spread of gambling amongst its population.

Yet, thanks to the advent of the Internet and other technological innovations, and the loosening of regulations that might otherwise restrict peoples' exposure, those predisposed to gambling on sports events will find it even easier in future.

Gambling 2030-Style

Let us jump forward to, say, the year 2030, and experience the 'greater access,' 'new options,' and the ability to 'feel more comfortable placing larger bets', boasted by those with vested interests in promoting sports gambling today. Not least as technology is 'opening up this industry to more consumers than ever before and leading to new revenue flows.'

Imagine you are a punter of the near future, sitting at home, in a sports bar, or even having a meal in a restaurant. With the benefit of AR (augmented reality), you are virtually transported to a live game as it happens, as immersed in it as if you were actually at the field, course or hall, anywhere in the world. Your AR device even allows you to access data happening in real time so you can instantly bet on micro-activities taking place during the game itself.

Your options are endless. No longer are you restricted to betting on whether a team, animal, or individual player wins or loses, but can place micro-bets on an individual action or performance: Will the kicker taking part in that NFL tournament make or fail? How many corner kicks will there be in the soccer game you are watching, and who will score the first goal? While watching a golf tournament, you can bet on individual swings, putt lengths or even the winner of a particular hole. Then, of course, there is the rise of esports, which became an Olympic activity some years previously, offering you a whole new world of betting possibilities.

As part of the premium package you have opted for, with your chosen online sportsbook, you have access to data from microchips embedded into balls, helmets and clubs, amongst others. The sports gambling industry has not yet been successful in lobbying for athletes' biometric data to be made legally available but, given the tax revenues these organisations generate, it should not take too long for politicians to be persuaded to agree. All of which, being more informed, gives you the sense that you have total control over the bets you place. And thanks to advances in

blockchain technology, you are no longer restricted only to making bets, but can accept those of other users - in short, acting as a bookmaker yourself.

You are so totally immersed in everything going on around you, with the added attraction of the neurotransmitter boost you get due to the fast-paced nature of the micro-bet (see Sidebar), it is easy to overlook the spending limits you had set yourself. Your online membership, pushed on social media by influencers who promote how simple, quick and nuanced sports betting is today, tempted you with all manner of welcome offers. One of which was 'sweat-free' bets. Meaning that even if you lost, you had the opportunity to place the same amount, without laying out any more money, within a specified short amount of time. Buoyed by the opportunity to enjoy these 'free bets,' you found yourself engaged far more than you had originally intended.

Thrilling World or Disaster?

The appeal of sports gambling now and in the future, will lie in the guarantee of a transparent and a 'more trustworthy environment' thanks to 'cryptographic algorithms' that 'can lead to increased user engagement and a more vibrant online betting ecosystem.'

The more readily available something becomes, the more people will be attracted to it. Push out more messages across social media platforms, TV advertisements, app ads and so on, that sports gambling is a fun activity with the possibility of big wins, while watching those figures rise. As, indeed, they already have.

According to Polaris Market Research, in 2021 the global sports betting market was valued at US\$70.23 billion, with expectations that this will almost double by 2030. The regions showing the greatest increases being Europe and Asia Pacific, although no further growth is expected across Africa and the Middle East. The site goes on to say, 'In comparison to 2019, some sporting events have seen a 206% growth rate in bets in 2021.'

The more places in which gambling is available, and the easier it is to place bets, the happier (and richer) the industry will be. In 2018 the U.S. Supreme Court struck down earlier federal legislation that banned sports betting across states. Now, some interested parties are envisioning restaurant hybrids where people can 'place wagers while enjoying great food and custom sports book content on TVs throughout the restaurant.'

In the words of one journalist who wrote *The Atlantic* article entitled *Sports Gambling is a Disaster Waiting to Happen*, 'the future of money in sports is gambling.' That is of great benefit to gambling organisations, of course, but overlooks the misery associated with enticing people to bet on sports events far beyond their means - indebtedness, broken relationships, ruined livelihoods and the need for addiction interventions.

Economic Pros and Cons

While governments globally continue to lower restrictions to online, high tech-powered sports gambling, thinking primarily of the huge revenues they can pull in as a result, there are—as always—unanticipated consequences to this behaviour. Few studies look seriously, not just at the social harms associated with unregulated betting, but at the financial costs to government as a result. Yet these are very real, as the following examples demonstrate:

1. From The Economic Cost of Gambling-Related Harm in England's updated report 2023: The annual societal value of impacts around health, financial, employment/education and criminal activity, 'provides a combined estimate of approximately £1.05 to £1.77 billion,' which is, 'likely an underestimate of the true scale of the total economic burden associated with harmful gambling.'
2. A paper entitled The Societal Costs of Problem Gambling in Sweden based on 2018 data reported that, 'the costs of gambling to society are high and amounted to €1.42 billion in Sweden, corresponding to around €139 per inhabitant.' These costs were related to a variety of direct, indirect and intangible factors.
3. A study conducted in the state of Victoria, Australia, reported by the Victorian Responsible Gambling Foundation found that, 'when low-risk and moderate-risk categories were included, the cost of gambling in Victoria in 2014-15 totalled \$7 billion, as compared to a previous figure of \$2.4 billion when including only the more severe, but less prevalent problem gambling group.'

Back to the Future

In the 18th century, the first UK bookmaker, Harry Ogden, opened his business and changed the face of sports betting. Up to that time punters had only been able to bet on who was likely to win a race. An avid fan of horse racing, Ogden had long studied individual animal performance and noted that even if they did not win every race, some horses were more likely to win than others, over time. Hence the emergence of bookmaker 'odds.' According to one article written about him:

"Harry Ogden was wealthy enough to pay those who won because he created odds that were always going to be in his favour. Regardless of which horse won, he walked away with a profit every race."

As sports gambling behaviour spreads in the future, powered by technology, there will inevitably be winners, and losers. One thing is for sure, gambling organisations will not be on the losing side. The extent to how much a society loses overall, however, is a matter for its government's conscience.

Why People Bet?

From a psychological perspective, human beings are said to seek two things: To avoid pain and to seek pleasure. The reward centre of the brain releases a neurotransmitter called dopamine in response to activities we find pleasurable. Being also linked to memory and motivation, we remember the environmental clues that triggered those pleasurable sensations in the first place so we are driven to seek them out again and again.

But we should not ignore the other human desire, to avoid pain. According to one Vox.com article, '1 in 5 Americans believe the lottery is the only way they can accumulate a significant amount of savings.' And if that is not a sign of desperation, consider that from the same article, '15 percent of Millennials say the lottery is their retirement plan.'

While playing the lottery is somewhat different to betting on sports games, a study from the U.S. indirectly suggests the potential dangers of promoting 'micro-bets,' aided by technology. Once players found they weren't winning the Powerball, which is drawn only a couple of times a week and offers long odds, they gravitated to tickets that had smaller monetary prizes but were drawn several times a daily. From there, they tended to shift to scratch cards, which had no limit on how often or when you could play. That is indicative of addiction.

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VICTORY

Beyond the Finish Line

Future Trends in the World of Sports



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“

Sports, which in the past were essential in forging a tribal and then a national identity, are now forging a planetary identity.

Michio Kaku

”

As the sports industry constantly evolves, it becomes crucial to adapt to emerging trends brought about by the rapid advancement of technology, shifting demographics and evolving consumer preferences. It is essential for various stakeholders, including clubs, federations, media outlets, equipment manufacturers, textile companies, sport services providers and betting firms to stay informed about the 11 significant trends currently shaping the world of sports. Being aware of these trends and responding to them promptly can enable stakeholders to stay competitive and relevant in this dynamic and ever-changing landscape.

TREND 1: Esports Rising in Popularity

Esports has experienced a significant surge in popularity, becoming increasingly mainstream in recent years. This can be attributed to several factors. Advancements in technology and widespread access to high-speed internet, have made it easier for players to connect and compete online, opening the doors for millions of players to engage in competitive gaming and creating a global community of esports enthusiasts. The increasing accessibility of gaming technology, the rise of streaming platforms and the support from major companies have propelled esports from a niche hobby to a mainstream phenomenon with a passionate fanbase.

Did You Know?

Revenue in the Esports Market on Esports

Revenue in the esports market is projected to reach

USD5.31 million in 2023.

Revenue is expected to show an annual growth rate

(CAGR 2023-2027) of 12.37%,
resulting in a projected market volume of
USD8.47 million by 2027.

Source: Statista, 2023

TREND 2: Artificial Intelligence (AI) will be prevalent

Artificial Intelligence (AI) is significantly impacting the sports world and its influence is expected to expand further in the future. AI is utilised in various ways in sports:

- **Performance analysis:** AI analyses data from sensors, cameras and wearables to provide insights into player performance, aiding in training and strategy improvement.
- **Injury prevention and player health:** AI systems monitor physiological data to identify injury risks, optimise training and suggest recovery periods.
- **Enhanced fan experience:** AI technologies like computer vision and natural language processing personalise experiences, while VR, AR, chatbots and voice assistants engage fans and provide real-time updates.

- **Referee assistance:** AI assists referees in making accurate decisions by analysing video footage for rule violations.
- **Sports analytics and scouting:** AI algorithms analyse data to identify patterns, predict outcomes and provide insights for scouting and making strategic decisions.
- **Automated sports production:** AI automates aspects of sports production, such as camera selection and video editing, to streamline content delivery.

Future advancements may include advanced predictive analytics, real-time decision support for coaches, AI-powered training partners, improved virtual reality experiences, AI-powered sports equipment and enhanced fan engagement.

The valuation of the Global Artificial Intelligence in Sports Market is estimated to be USD2109.55 million in 2022 and is anticipated to reach USD16685.91 million by 2030. The market is projected to witness a robust Compound Annual Growth Rate (CAGR) of 29.50% during the forecast period.

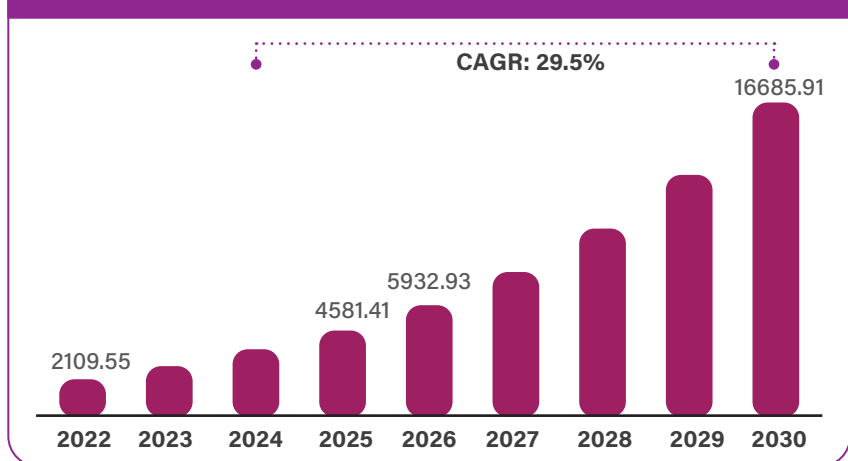
Did You Know?

Value of Artificial Intelligence in Sports Market

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Artificial Intelligence in Sport Market Size, 2022 to 2030 (USD Million)



Source: Statista, 2023

TREND 3: Fans are Taking Content on the Go

Fans taking content on the go in the sports world means that sports enthusiasts can access and enjoy sports-related content anywhere they want. With the rise of smartphones and tablets, fans are no longer limited to watching games on TV or attending live events. They can now use mobile apps and websites to access live streams, highlights and updates of ongoing games. They receive notifications and alerts about scores, player statistics and breaking news, keeping them informed at all times. Social media platforms also enable fans to engage in discussions, share opinions and connect with fellow sports enthusiasts in real-time. This trend offers convenience, flexibility and the ability to stay connected and engaged with their favourite sports.

TREND 4: The Game-Changing Generation

The Game-Changing Generation in the sports world refers to individuals who are revolutionising the industry through technology integration, fan engagement, social impact and innovation. They leverage advanced analytics, virtual reality and wearables to enhance player performance and fan experiences. This generation promotes sustainability, embraces esports and explores new sports formats. In the future, they will further utilise AI, enhance fan experiences, prioritise sustainability, integrate emerging technologies and foster global collaboration. Overall, they are transforming sports through their innovative mindset and technological advancements.

TREND 5: Inclusive Sports Culture

The future of sports will be more inclusive and diverse, with increased accessibility for people of all abilities, backgrounds and gender identities. Adaptive sports will gain more recognition and mainstream acceptance.

- The push for gender equality will lead to more mixed-gender competitions, with men and women competing together in team sports and individual events.
- Sports culture emphasises celebrating the achievements and contributions of athletes from diverse backgrounds. This trend involves highlighting the stories and successes of athletes from under-represented groups, promoting positive role models and showcasing the richness of diversity within the sporting community.
- Inclusive sports culture promotes accessibility for individuals with disabilities.

TREND 6: Data-driven Performance

The use of data analytics will transform sports, from player scouting to strategy development. Advanced metrics will enable coaches and athletes to make more informed decisions and optimise performance.

- The gamification of fitness and sports will lead to innovative training methods and more engaging experiences.
- Fitness apps will continue to grow in popularity, with increased personalisation and social elements.
- As wearable devices become more advanced and integrated into everyday life, expect them to have significant impacts on sports. Performance monitoring, injury prevention and personalised training programmes will become a norm.
- Virtual and augmented reality (VR/AR) technologies will become integral to sports, enhancing training, gameplay and spectator experiences.

TREND 7: Emerging Ethical Issues in High Performance Sports Science

Advances in technology, such as genetic testing, gene editing and neuroenhancement, present ethical challenges in high-performance sports science.

- Genetic testing raises concerns related to privacy, discrimination and the potential for creating genetically modified athletes. In 2003, the World Anti-Doping Agency implemented a ban on 'gene doping,' which refers to the unauthorised utilisation of genes, genetic elements or cells with the potential to improve athletic performance.
- The use of technologies to gain unfair advantages, the potential health risks associated with certain enhancements and the impact on fair competition are significant considerations.
- Collecting and analysing athletes' personal and biometric data can have implications for privacy, consent and potential misuse of sensitive information.
- Ensuring integrity in sports and combating corruption, such as match-fixing, doping cover-ups and bribery, remains a significant ethical issue.
- Athletes using their platform for social and political activism raises ethical considerations.

TREND 8: Mindfulness and Mental Health

As mental health continues to be prioritised in sports, we can expect to see greater integration of mindfulness, meditation and psychological support into training programmes and support systems. Athletes will have access to resources and professionals who specialise in mental health, empowering them to manage their mental well-being effectively. Mental health plays a crucial role in an athlete's performance. Physical training alone is not sufficient to excel in sports. By prioritising mental health, athletes can improve their focus, concentration and decision-making abilities. 'Recovery services' like massages, cryotherapy, ice baths and sauna sessions are growing trends as reported in 2022 Wellness Index.



Source: 2022 Wellness Index

TREND 9: Rehabilitation in Sports - pre, during and post-event

Rehabilitation in sports is a critical aspect of athlete care, helping injured athletes recover, regain their physical abilities and return to their sport safely. Over time, various trends have emerged in the field of rehabilitation, driven by advancements in technology, research and a deeper understanding of the rehabilitation process. Rehabilitation professionals now rely on comprehensive assessments, diagnostic tools and research-based interventions to design targeted treatment plans. Technology has had a significant impact on rehabilitation in sport. Advancements in equipment, software and wearable devices have provided new tools to enhance the rehabilitation process. For instance, virtual reality (VR) and augmented reality (AR) are being used to simulate real-life sport-specific scenarios and facilitate motor skill relearning. Wearable sensors and motion analysis systems help monitor movement patterns, track progress and provide immediate feedback to both athletes and rehabilitation professionals.

TREND 10: Green Sports Movement

The sports industry will emphasize sustainability, with eco-friendly initiatives in stadium construction, event management and athletic gear production. This trend will also influence athletes to become environmental advocates.

- Sports organisations are committing to reduce their carbon footprint and work towards carbon neutrality. This involves implementing measures to reduce greenhouse gas emissions from operations, transportation and energy consumption.
- Efforts to minimise waste generation and promote recycling are gaining traction in the sports industry. Adopting sustainable procurement practices for food and beverage services, including sourcing local and organic products, is also part of waste reduction efforts. Bergzeit, Sneaker Rescue, Yonderland and SOEX are companies that are dedicated to sustainability. Their focus goes beyond simply closing the loop; instead, they strive to transform the loop, broaden its scope and prolong the lifespan of products.
- Sports organisations are actively promoting sustainability initiatives to athletes, fans and the wider public through campaigns, events and partnerships.

VIEWPOINTS

Felix Philipp and Manuel Braun identify three main patterns and the best practices as follows:

Model Patterns

Best Practices

Implement a critical raw material and recovery strategy for resilience

A1

Approach **recycling as strategic sourcing**, diversity supplier landscape and embed recovery into net-zero strategy.

A2

Implement **track and trace solution** for key material flows (supply chain, product).

A3

Drive **value chain and cross industry collaboration** to solve system challenges.

Test refurbishment and resale offering, decoupling sales from new production

B1

Understand **customers segments, secondary market patterns** and dynamics

B2

Evaluate potential **own trade-in, refurbishment and resale** business model.

B3

Explore **repair strategy and offering** (remote, partner network).

Explore service-based, data-driven business models to drive growth

C1

Develop **use-phase data platform** and monitor and support **customer engagement**.

C2

Explore **integrated product and service design** (rental, product-as-service).

C3

Think in **utility/ outcomes of the product** and respective additional services (insurance, nutrition, consumables)

Source: *Circular Business Models in Sports, 2022*

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The Role of Sports in Delivering the Sustainable Agenda:

Development of Net Zero Sports Facility

The United Nations (UN) Climate Change initiated a climate action for sports movement as a guideline to achieve the global climate change goals in line with the Paris Agreement. This initiative managed to attract many sports organisations to be part of it. The first motivation is to drive the global sports community to combat climate change via commitments and partnerships based on the standards including measuring, reducing and reporting. Secondly is to capitalise on the sports platform to federate and inculcate solidarity among the global sports community for climate action.

Various programmes are organised by the UN, such as knowledge sharing and exchange programmes, as well as capacity building, to enhance the understanding of the sports for climate action principles. There are five set principles to be incorporated in the strategies, policies and procedures to be taken up by the sports community.

The principles of Sports for Climate Action are as follows:

Principle

1

Undertake systematic efforts to promote greater environmental responsibility.

Principle

2

Reduce overall climate impact.

Principle

3

Educate for climate action.

Principle

4

Promote sustainable and responsible consumption.

Principle

5

Advocate for climate action through communication.

In this context, UN Climate Change will facilitate and coordinate the works undertaken by signatories to Sports for Climate Action.

Within the highlighted principles, the signatories need to undertake the following tasks;

-  **Undertake systematic efforts to promote greater environmental responsibility**
-  **Reduce for climate action**
-  **Educate for climate**
-  **Promote sustainable and responsible consumption**
-  **Advocate for climate action through communication**

Proceeding into this, the signatories mutually agreed to commit to reducing 50% of Greenhouse Gas (GHG) emissions by 2030 and achieving net zero by 2040. To materialise, the signatories are required to outline 4 key steps which comprise pledge, plan, proceed with action and report. This requires a systematic approach to translating the action as the committed stakeholders need to submit the milestone and plan to the UN Climate Change with immediate action.

In meeting the future demand for physical sports activities, the Malaysian sports community also needs to consider a sustainable development of the net zero sports facility as a part of the initiative to reduce GHG emissions. By setting up a long-term pledge, the organisation can design its plan with realistic actions since the implemented initiatives must be reported annually to the UN Climate Change. The overall process will require detailed evaluation to understand the long-term usage of the facilities by integrating them with sustainable development.

One of the action areas, is to develop a net zero sports facility, which is applicable and more feasible for the green field. Compared to the brownfield, it is essential to have a comprehensive assessment of how the GHG emission is being contributed from the facility, such as the energy being consumed and wasted. Based on the study, it is estimated that an average professional sports stadium will consume 5-10 Megawatt MW of electricity during sports events equivalent to 5,000 American homes. There are a few international benchmark initiatives on developing net zero sports facilities based on the greenfield or brownfield project as follows.

List of Sustainable Initiatives by Sport Organisation

Sports Venue/ Organisation	Sustainable Initiatives: Net Zero Sport Facility
Watford FC, England	Partnering with ClearVUE to transform the energy consumption at the sports facility and training ground towards reducing GHG. Renewable energy systems, smart energy management systems and recycling facilities
Tottenham FC, England	The new Tottenham Hotspur Stadium reduced the carbon emission by using renewable energy
Arsenal FC, England	Recycle 80% of match-day waste and divert the food waste into anaerobic digestion plant
Ajax's Johan Cruyff Arena Amsterdam	Installation of solar PV rooftop (4,200 panels) and off-site wind turbine
Mercedes Benz Arena Atlanta Georgia	Solar PV systems (4,000 panels) with saving electricity at 29% and water system to save 47% water consumption
New York Yankees	High-efficiency LED lighting recycling and composting and water conservation system
Qatar Stadium 974	Constructed using modular design based on the containers system with less life cycle emissions
Queensland Country Bank Stadium Australia	Passive design structure with embodied carbon features. Integrate solar management with reasonable sun protection for the audience and glass facades, natural ventilation to reduce the reliance on the HVAC system and access to the daylight
Ken Rosewall Arena Australia	Optimisation of the roof shape and operable façade to enhance the internal airflow and manage the thermal comfort
Michelle and Barack Obama Sports Complex	Natural ventilation design with a greywater system. Solar PV systems and electric vehicle charging stations

As the list is not extensive, there are other clubs committed to net zero and implemented sustainable initiatives to offset the carbon emissions not mentioned here; they include Forest Green Rovers, Juventus, VfL Wolfsburg, Hibernian, Liverpool, Manchester United, Chelsea and Southampton.

In principle, the concept design of a net zero sports facility may require various sustainable technology applications to reduce and mitigate GHG emissions such as a solar PV system or other types of renewable energy, rainwater harvesting for water consumption, LED lighting and alternative energy supply such as hydrogen modular system integrated with fuel cell or energy storage system to provide supplementary energy to the facility.

The structure of the building can also be developed by using bio-based materials and embedded by using the Industrialised Building System (IBS). The surface materials for the court also need to consider green type coating material. Furthermore, the sports facility needs to be designed by incorporating natural-based solutions.

Malaysia is committed to achieving net zero by 2050 at the national level. Various initiatives have been taken by the Ministry, Government Agencies and private sectors in this agenda. In response, MIGHT, as a national technology think tank is also putting a long-term aspiration in the net zero initiative. This has been captured as one of the strategic thrusts in MIGHT's Corporate Plan 2025, Sustainable Technologies Development and Application under Initiative 3 to Transform MIGHT Partnership Hub into an 'innovation to zero' showcase.

To demonstrate this, various sub-initiatives are being implemented on the ground such as the installation of Solar PV systems, an efficient cooling system using a Liquefied Natural Gas (LNG) source, a green data centre and the development of a net zero sports facility within the MIGHT's facility.

Conceptually, the net zero sports facility will adopt green construction practices under the CIDB guidelines, to ensure the construction process of the multi-purpose court aligns with the sustainable practices. The outdoor sports facility will consist of a multi-purpose court and one sports building. The court's surface will be developed using green material and the multi-purpose court's design will be able to cater to a few main activities such as futsal, takraw, basketball and volleyball. The sports facility will be equipped with an LED lighting system and integrated with a solar PV carport. It is also planned for the building constructed using the Industrialised Building System (IBS) based on Kenaf bio-composite material. This will provide more advantages in terms of carbon embodied, as highlighted by the International Panel on Climate Change (IPCC) that the construction sector has the most significant mitigation potential. The water system at the building will utilise rainwater harvesting for cleaning usage purposes. A small renewable energy system will be established to provide electrical power to the LED lighting system in the building. The cooling power can also be applied by leveraging the existing LNG cold grow system.

While having various sophisticated technologies for the sports facility, it also requires a sustainable working model of the facility development and operation to ensure sustainability as well as promote the partnership spirit with the stakeholders. In addition, this can be a platform to showcase sustainable technology applications via innovative new business models in achieving the net-zero target.



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Unleashing the Power of Technology: Embracing Cutting-Edge Innovations for Peak Performances in Sports

Nowadays, athletic records do not last too long due to advances in sports science, technology and developments in training techniques. Recall 1998, when Watson Nyambek set a sprint record of 10.30s in the men's 100m dash; it was finally broken in 2016 by Khairul Hafiz Jantan with a time of 10.18s. Unlike the 18-year-old attempt, however, Khairul Hafiz's record was broken within six years, by 19-year-old Mohd Azeem Fahmi with a 10.09s sprint at the 2022 World Athletics U20 Championships heats.

While athletes push themselves to the limit to achieve the best possible outcome, methods and techniques in sports performance and training have also evolved dramatically over the years – making current sports achievements outperform those of the yester years. One significant contributor to the evolution is technology. Advancements in technology have revolutionised sports performance and training, allowing athletes and coaches to gain insights into their performance like never before.

Let us take digitalisation as an example. Digital technology has opened the sports industry to new innovations, bringing improvement measures and new experiences to both the athletes and the industry players, as well as the spectators. From IoT, sensors and devices, to data analytics on game performances and AR/VR-empowered training programmes, the sports industry goes through constant, exciting and at times, unimaginable advancements.

How Technology Is Changing Athletes' Performances

It is anticipated that the advancement in technology will bring athletes to another level and break more records as technology enhance athlete performance to the highest limits:

Perfecting Athletic Movements and Eliminating Injuries

Technology that allows for the collection and analysis of intricate data on athletic movements creates safer training environments and reduces the risk of injuries. Utilising data-driven insights will enable trainers to help athletes perfect their technique, at the same time trainers can identify injury risks early and take proactive measures.

Technology

Perfecting Athletic Movement and Eliminating Injuries

Sleep Monitoring

- It has long been known that sleep is important for athletes. Their bodies need sleep to get enough rest and allow them to rebuild cells. Sleep is also important for focus and optimal performance.
- Sleep monitoring not only tracks how much sleep the athlete is getting, but it also monitors when they sleep, their sleeping patterns and the quality of their sleep. This can help an athlete by giving them an idea of how much more sleep they need and if they need to improve the quality of their sleep. By putting strategies in place to improve this, they can improve their focus and overall performance.

3D Scans

- A health startup called Klarismo creates medical imaging that gives a greater understanding of the physiology and composition of individuals.
- In the past, MRI scans were only available for medical investigations. Klarismo is now making the same technology available for doctors working with sports teams. One piece of information that the scans can reveal is the ratio of fat to muscle of an individual. It can also help to identify any weak areas that could increase the risk of injury in the future.

Mental Stimulation Technology

- The mind plays an important role in athletic performance. Just some of the roles of the mind in sports are focus, coordination and precision. Therefore, warming up the mind can make a significant difference to performance.
- Halo Sport - a headband with foam nibs that deliver pulses to the motor cortex to fire neurons together. The product is connected to the Halo Sport app, which records data collected while wearing the headband. By wearing the technology for 20 minutes before training or an event, an athlete will increase their brain plasticity and their ability to make new circuits.

Injury Recovery Wearable

- There is a wearable technology available that can help an athlete recover from an injury quicker and improve their performance following an injury. They do this by measuring muscle stress when a load is placed on an athlete during training.
- FC Dallas is already using such technology to help their players recover from injury. The Major League Soccer team has seen impressive results, with players recovering as much as two months earlier than predicted because of the information given by the wearable technology.

Football Position Tracking

- Tracking devices are used to record how the players move when they are in possession of the ball and if they are involved in any collisions.
- This data is then collated and used by football coaches to plan training sessions and to put players in the positions where they are needed the most or where they can make the most useful contribution to a game.
- In terms of the training programmes, coaches use the information to individualise training programmes for each player so they can make improvements on weak areas.

Swing Analysis

- Swing Technologies is a range of motion capture and analysis programmes that are easy to use. They monitor swing action that is then analysed using a comprehensive software suite for video analysis. This allows a player to try different techniques and postures to improve their swing.

Tracking Performance

Athletes wear sensors or smart clothing to measure real-time metrics like heart rate, breathing, hydration and temperature. Trainers can make data-driven decisions on rest, stretching and training intensity. Below are examples of the technology that tracks athletic performance:

Technology	Tracking Performance
Wearable hydration trackers	<ul style="list-style-type: none"> Wearable hydration trackers help athletes to optimise their hydration levels. Getting hydration levels right during physical activity is essential. Too much water will cause athletes to feel sick and bloated, while not enough leads to dehydration. Harvard has produced a product called Nix - a wearable hydration tracker that lets athletes know when, what and how much to drink.
Respiratory Monitoring	<ul style="list-style-type: none"> One of the examples of this technology is Strados, -a technology that uses a microphone and specialised mechanical coupler to monitor every wheeze, cough or irregularity in breathing. Taking respiratory monitoring one step further. The results it records combine heart rate, respiratory rates and activity levels. Athletes can then use the data to improve their performance.
Smart Clothing	<ul style="list-style-type: none"> Measuring fitness during training sessions is a vital element of improving performance in the modern world of sport. Smart clothing has sensors to measure how the body performs during exercise. The sensors sync with a mobile app that measures muscle activity and exertion levels.
Biomechanical Technology	<ul style="list-style-type: none"> Biomechanical technology allows researchers to observe, measure, experiment and test the performance of an athlete. Biomechanical technology uses data-driven approach to understand athlete movements, and uses its suite of technologies to assess all the information from the athlete. The information is used to build superior versions of who the athletes already are.
Military Technology	<ul style="list-style-type: none"> There are even examples of how military technology is being applied to athletic performance. One such practitioner is sports science pioneer Mackie Shilstone. He has become known as a career extension specialist as he predominantly works with older athletes perceived as approaching the end of their athletic careers. He uses a variety of technologies to get the best out of his clients, including DEXA x-rays, physician assessments and nutritional planning. He has also used military technology, such as the run and gun drills. Similarly, he used data relating to fighter planes to improve the performance of NFL players.
Sports Genetics	<ul style="list-style-type: none"> Scientists have discovered that analysing an individual's DNA can give them vast information about the person. It can already tell them if the person is genetically predisposed to suffer from certain conditions and the details of their ancestry. Genetic markers can tell them everything they need to know about how an individual athlete could improve their performance. Not only can they discover which sport a person is most likely to excel in, but they can understand what a person needs to eat to succeed and how their body will react to intensive training.
Hydrodynamics	<ul style="list-style-type: none"> Hydrodynamics is the study of reducing resistance in the water. Its technology has been used on many occasions to help those whose sport involves spending time in the water. The perfect example of this is creating materials for swimming costumes that allow a swimmer to glide through the water at speed because the materials are not causing resistance.
Performance Nutrition	<ul style="list-style-type: none"> A lot of scientific research into athletic performance has focused on nutrition. This has shown scientists what athletes need to perform better and then to create technologies that can produce what the athletes need. Ketones have been a significant area of interest for scientists and nutritionists as these give a rapid burst of energy and encourage the body to burn fat instead of the glucose from carbohydrates. Ketones are naturally produced in the body, but researchers at Oxford University have now used technology to reproduce them for an innovative new sports drink that will improve athletic performance.

Enhancing Communication

Applications and social media platforms enable athletes and trainers to easily upload and share training tips and ideas, facilitating film analysis and play discussion. Platforms like My Fitness Pal allow trainers to track athletes' diet, exercise and health information, promoting personalised accountability and interaction.

Technology

Enhancing Communication

Video Technology

- Video analysis and video refereeing are now used in a wide range of sports. The analysis allows individuals, teams and coaches to assess strengths, weaknesses, mistakes and areas that require further training. This information is then used to improve performance through better training programmes and by implementing new strategies.
- Video refereeing can have more accurate results and is less biased than relying solely on human referees. It can show incidents in more detail and in slow motion. Video refereeing also allows viewing of an incident from a different angle.

Virtual Reality

- ID Tech says that virtual reality is becoming useful for improving athletic performance and for engaging fans. Using virtual reality allows athletes to practice moves such as throwing in a virtual space with reduced risks of injury, giving them safer and at times, more creative ways to improve their techniques.
- Fans can also benefit from virtual reality as live sporting events are broadcast using a combination of live imaging and virtual reality to give them an holistic viewing experience.

Team Performance Analytics

- When a team of athletes takes part in a sport, it is important to look at the performance of the team as a whole and not just as a group of individuals.
- ID Tech gives the perfect example of how technology is used to do this. Kirk Lacob is the son of the owner of the Golden States Warriors. A Stanford graduate, he began tracking the data and statistics of the team. He developed a programme to track team performance analytics so that they could use the data for improving the team's performance.

Technology and Athletes' Dedication Redefine the Limits

As technology continues to advance, it is highly likely that we will witness a continual wave of record-breaking performances in various sports disciplines. Athletes will benefit from the advancement and evolution toolkit of sports science and technology, allowing them to optimise training methods, recovery strategies and technical skills. The convergence of human athleticism and technological innovation, promises an exciting future for sports, where new boundaries will be challenged, records shattered and the limits of human potential continually pushed.

Ultimately, the combination of the athlete's dedication, evolving training techniques and the power of technology will shape a new era of sports performance, where the limits of what is achievable continue to expand.

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Sports City Ecosystem:

Drivers and Enablers



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It has been decades since the last Kuala Lumpur Commonwealth Games in 1998 being the prime example of how a major sports event can catalyse the development of a city's sports infrastructure, and transform it into a 'Sports City'. Kuala Lumpur, the capital of Malaysia, had to upgrade its facilities to host the games, which brought together athletes from 70 countries. The government invested heavily in constructing new sports facilities, such as the National Sports Complex, which included a 50,000-seat stadium, an aquatic centre and an indoor arena. These facilities were designed to meet international standards and cater to a variety of sports, such as athletics, swimming, badminton and basketball. Additionally, the city of Kuala Lumpur upgraded its transportation infrastructure, including new highways, rail lines and airports, to make it easier for athletes and visitors to get around.

According to Malaysian Industrial Development Authority (MIDA), sports is an important income generator in the tourism industry, contributing approximately RM5 billion annually. It is also supported by a broad global audience, as sporting events usually attract domestic and international participants. Revenue streams come from ticket/gate sales, accommodations, food and beverages, to sponsorships, media rights, merchandising and garment production, amongst others.



1998 Commonwealth Games



Formula One Championship Car Racing (F1 Grand Prix) Sepang

6,670 athletes and officials

RM3,800 a single international
tourist expenditure for
12.5 night stay

RM500 million

contribution to the national economy
(with spill-overs continuing in years after)

Source: MIDA

By creating environments that make it easy and enjoyable for society to engage in physical activity, and designing spaces that encourage active living, sports cities can help to improve and promote health and well-being, especially in an ageing nation.

But how can an ecosystem be developed to support a sports city? We explore the key characteristics of a sports city through the lenses of MIGHT's F.I.R.S.T.[®] or Funding, Infrastructure and institution, Regulatory and policies, Skills and talents and Technology for a holistic and sustainable approach on the viability of such initiative.

Funding for sustainability

Why does this matter?

Funding is necessary to construct and maintain facilities such as community centres, parks and walking trails that are accessible and appealing to the community. Without funding, these facilities may not be built, or they may fall into disrepair. Funding can be used to develop and implement programmes and services that cater specifically to the needs of society, such as fitness classes, health education workshops and social events. These programmes and services can help society maintain their physical and mental health and stay connected to communities.

To ensure the longevity of these facilities and programmes, sustainable funding sources such as grants, partnerships sponsorships and user fees, must be secured. This way, they can continue to support the well-being of society, including older adults, for an extended period.

Infrastructure to accelerate development

Why does this matter?

The sports industry's continuous expansion has generated noteworthy investor attention, leading to greater professionalisation and commercialisation in the field. Those who own sports rights are looking to leverage this influx of investment to support ambitious growth objectives, while investors are aiming to establish portfolios that encompass sports, technology and entertainment.

Fast and reliable internet connectivity is increasingly important to sports fans, and digital infrastructure plays a critical role in meeting this demand. At the 2022 FIFA World Cup in Qatar, Ooredoo became the first Middle Eastern and African telecom operator to provide 5G internet access in Doha, highlighting the importance of technological infrastructure for sporting events. Governments often spend significant amounts of money

on mega events such as the Rio de Janeiro Olympic Games in 2016, which cost USD13.2 billion and accounted for 15% of the city's Gross Domestic Product that year. To justify the high cost, cities must create a legacy of high-calibre global events to achieve a return on investment and become major sports hubs.

Non-technological infrastructure is equally important. For instance, sports cities need to identify and incorporate parks and green spaces that provide safe, accessible areas for people to engage in physical activity such as walking, running or cycling. Likewise, active transportation, must also be encouraged and made safe - making walking and cycling, the preferred choice to reach a destination, instead of relying on cars.

Regulatory for better governance

Why does this matter?

Regulatory and policies are fundamental to create an enabling environment for the establishment of the trust and to allow authorities, investors, developers and operators to be key stakeholders in this approach for public-private-partnerships.

Designing a sports city is influenced by regulatory aspects such as zoning regulations, building codes and land

use policies. These regulations are essential for ensuring that the design of a sports city is safe, efficient and sustainable. In addition, regulations can help ensure that sports city development is consistent with broader urban development plans, such as those aimed at promoting green spaces, walkability and active transportation.

The key elements of sports city design include the integration of sports facilities, green spaces and pedestrian-friendly streets. These elements are critical for promoting physical activity, social interaction and healthy living. Green spaces, such as parks, trails and open areas, provide opportunities for outdoor recreation and relaxation. Pedestrian-friendly streets, such as wide sidewalks, bike lanes and pedestrian crossings, facilitate active transportation and community connectivity.

The development of a sports city should be guided by the national structure plan, which in a long-term provides a framework for land use and development. The structure proposal is implemented through local development plans, which provide more detailed guidance on land use and development at the local level.

Agility of skills and talents to support growth

Why does this matter?

Access to talent and human capital is important for the development of successful sports teams, events and programmes. Cities that have access to talented athletes, coaches and sports scientists are more likely to have successful sports initiatives. Sports cities require a skilled workforce that can manage and maintain the various sports

facilities, organise events and provide guidance and support to athletes and sports enthusiasts. These talents can fill various roles in sports city, such as coaches, fitness trainers, sports analysts and sports event managers. They can also work in sports science research and development, designing and implementing training programmes, nutrition plans and injury prevention and rehabilitation programmes. According to Malaysian Qualifications Agency (MQA), as of 2019, there were 18 public and 23 private institutions in areas of sports sciences.

Harnessing the potential of smart technology to accelerate development

Why does this matter?

Smart city initiatives can play a crucial role in accelerating the development of a sports city. The integration of technology and data in urban planning can help to optimise the use of existing infrastructure and resources, while also improving the quality of life for the residents. For example, the use of sensors and data analytics can be used to monitor the usage of sports facilities and identify areas that require maintenance or improvements. Smart transportation systems can also promote active transportation, such as cycling and walking, by providing safe and convenient routes for residents. Additionally, the use of digital platforms can improve the accessibility and convenience of sports-related services, such as online booking of sports facilities and virtual fitness classes. By leveraging smart city initiatives, the development of a sports city can be more sustainable, efficient and beneficial for residents.

Cities are also using technology to improve the sustainability of sports city environments. Smart energy systems that utilise renewable energy sources, such as solar and wind power, are being implemented to reduce carbon emissions and promote sustainability. Additionally, cities are using technology to monitor and manage water usage, waste management and air quality, creating healthier environments for their people.

Some cities have successfully implemented technology-driven initiatives to support their initiatives. For example, Amsterdam has implemented a smart bike-sharing system that uses an app to track bike availability and provide route suggestions. Barcelona has created a smart parking system that helps reduce traffic congestion by providing real-time parking availability data.

Conclusion

In conclusion, cities' pursuit of sporting excellence will be complemented by additional factors like sustainability and inclusivity. Fans of sports and society at large, are seeking authenticity and more transparency and are no longer willing to simply be passive onlookers. Community engagement is essential for the success of sports initiatives, as it helps to build support for sports programmes and encourages participation in sports activities. A strong sports culture is necessary to promote and sustain sports initiatives. Additionally, as demographic shifts towards an ageing nation, planning of facilities also need to take consideration programmes and services for older adults, such as talents trained in areas like elderly fitness, nutrition and gerontology.

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Cycling as an Outdoor Sport: The Elixir of Life



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“ *The bicycle is the noblest invention of mankind.* ”

William Saroyan, Nobel Prize winner

✓ **Helmet?**
✓ **Check.**



✓ **Backlights?**
✓ **Check.**



✓ **Crank arms and pedals?**
✓ **Check.**

✓ **Brakes?**
✓ **Check.**



✓ **Water bottle and spare tube?**
✓ **Check.**

✓ **Tyre pressure?**
✓ **Check.**

VIEWPOINTS

All good to go on the bicycle, be it a foldable, mountain, gravel or road bike. Of course, this wonderful invention is also used by many adults to go to and from work or school, and to the grocers, or even for a parent to drop their kids off at school.

But cycling as an outdoor sport? Especially for adults aged 50 and above? Yes, why not?

Let us first look at the benefits of cycling. The late actor-comedian Robin Williams called it a mobile meditation. He was an avid cyclist. Being out in the open air improves brain functions, and if you cycle at the start of the day, bathing in the morning sun gives you healthy bursts of vitamin D. Cycling through the countryside, the *kampungs*, or in between oil palm plantations, allows you to enjoy the greeneries and breath in clean air. Cycling is gentle on the knees and joints, provided the bicycle you are on, is in good condition. Would brisk walking not be just as good, and provide the necessary cardiovascular movements? Though both are low-impact workouts, cycling is more intense and burns more calories. 'Additionally, it promotes physical coordination as it involves the quadriceps and other muscles that maintain your balance'. It is also a good endurance exercise, improves breathing and increases the heart rate.

Ultimately, it depends on your motivation level and end goal. For those above 50, we do not need to compare with the younger generations, who find thrill in speed and distance, enjoying the outdoors and landscapes as they fly by on their two-wheelers. On the contrary, we only need to live by the mantra 'mens sana in corpore sano' – a healthy mind in a healthy body. Relying on our trusted metal steed as a means for workouts. Regular exercise for the 50s and over, prevent us from ageing-related medical issues and cardiovascular problems, and it builds muscle strength. Still, it is a triple-helix approach, with sufficient sleep contributing 50%, a good diet 30%, and sports or exercising 20% (a formula shared by my trainer at a gym I used to frequent).

Indeed, many other activities besides cycling and brisk walking can promote healthy bodies, such as yoga, Pilates, golf, swimming and tennis. So, why focus on cycling? Simply put, cycling is not just about keeping fit and healthy. It is an option to get you from point A to point B, farther and quicker than what you could generally do with walking. Furthermore, not only is it a mobile meditation, it is also a non-polluting mode of transport. Non-polluting means it does not require fossil fuels, nor does it produce noise pollution.

As for the individual, keeping track of one's performance and health status during cycling is now facilitated via technology, with wearables in the form of smartwatches or fitness trackers. Aside from telling time and date and having all the common features the latest smartwatch would have, it can track and manage your health and workout status, including step calculation, hiking or cycling movements, sleep patterns, heart rate measurement, etc. It is the perfect gadget for health enthusiasts.

The big question is, how much do we want to rely on smartwatches to monitor our health and any other activities one may have? In any case, health monitoring the 50s and above age groups, be it via a smartwatch or manually, is imperative to gauge if they are exerting themselves and need take a few breather from activities, amongst others.

THE EVOLUTION OF BICYCLE TECHNOLOGY



History tells us that it all started in the early 19th century. Believe it or not, the first two-wheeled transportation machine was made of wood and had no pedals, and this is discounting earlier evidence of attempts to build a velo. The year 1817 saw the introduction of the velocipede, or 'dandy horse', aptly called so because it was created in response to the widespread slaughtering of horses due to crop harvesting failure earlier (Bicycle History Timeline; ibike.org).



Figure 1: The Dandy Horse

In Figure 1, we can see that there is a front-wheel steer. This dandy horse was a fad because the interest fizzled after they finally had a successful harvest and discovered that it could not balance on the carriageway.



Figure 2: The Penny Farthing

Then came another trend, the boneshaker, named so because of the rattling it made going over cobblestones. Its improvements were pedals at the front wheel, fixed gear and one speed. That was around the mid-1800s, and in 1870, the famous Penny Farthing debuted, and this all-iron two-wheeler was so renowned that it has been reconstructed and paraded on the streets during specific festivals.

Interestingly, the front wheel is much bigger than the back wheel, and the makers gradually increased the front wheel size upon realising that the more significant it was, the greater length travelled with one pedal. It has disadvantages owing to the high centre of gravity, risking the rider 'taking a header' when abruptly stopped. This was the beginning of the machine being called the two-wheeler. From then on, innovations kept rolling in with the creation of ball bearings, calliper brakes, change-speed gears, and rear-wheel chains, but usage was confined to the rich as it was costly to own one. Only in 1890, did we see the mass production of the same-sized wheels, and the bicycle kept evolving with the discoveries of new ways to improve the safety and comfort of the cycling experience.

Likewise, road bikes alone have many options, specs and price. At the turn of the 20th century, cycling became very popular, and one of every three patent applications had something to do with the bicycle! . We also have innovations and improvements in the helmet's design that ensure comfort, lightness, cool and protected. Interestingly, we have e-bikes, which ease cycling undulating terrains. You will still need to pedal with some models, of course, because not having to pedal at all, would defeat the purpose of having a bike in the first place.

Nowadays, bicycle frames are made from carbon fibre or alloy, which makes them lighter than iron, with the lightest total weight recorded at a mere 6.8 kg! . Why would the weight of a road bike be an essential feature to mention? Because it would be easier to handle for older adults. There is no need to install a carrier on the car because the bicycle's front wheel can be conveniently detached, and it can be put in the back seat if the rider needs to drive out to the starting point of the cycling activity.

Technology and innovation have markedly contributed to the evolution of the bicycle from when it was first invented, allowing the fad to become a trend that would keep growing, despite it dwindling for some time after motorised vehicles were designed. The trend will only grow steadily if cycling becomes a culture in our society. Cycling culture means cycling has become a mainstream mode of transport, and several countries exemplary of this culture are Denmark, the Netherlands, Belgium, Sweden, China and Japan.

Let us take one country, Japan, as an example of a nation with the best cycling culture (Source: earthbuddies.net). It is estimated that the number of bicycles in Japan is 60% of the total Japanese population of 120 million. Japan has always advocated using greener transportation; this is part and parcel of an intelligent society and what a developed country means. Aside from the Shinkansen bullet trains going at a top speed of 320 km per hour, the Japanese prefer non-automobile modes of transport and enjoy walking, commuting and cycling. Japan is an ageing society, with seniors aged 65 and above making up 28% of the population. Still, they are primarily healthy due to their fear of being a 'meiwaku', a Japanese word for burden, to their families and societies. According to one local associate professor in Health Management Research at the Keio Sports Medicine Research Centre, a higher cognitive ability (the brain's skills in performing day-to-day tasks from the simplest to the most complex) results from our athletic skills. Yuko Oguma said, "there has been evidence that muscles can continue to strengthen, even in old age, which is contrary to what we believed."

In Malaysia, there are infrastructures and dedicated cycling lanes, but there need to be more, so that cycling can become a mode of transportation. One big concern for Malaysians is safety, as we do not have sufficient dedicated cycling tracks. Therefore, a safe and adequate infrastructure can entice more Malaysians to cycle. Once it becomes a culture, at every opportunity and convenience, we will use the bike for our short traverses through the concrete jungle to get bread or a meal, visit a neighbour for as long as the weather permits, or go to work. These activities can contribute to working out. For the more enthusiastic, joining a cycling club or participating in cycling events, would be additional activities.

“

*The bicycle is a curious vehicle.
Its passenger is its engine*

John Howard, US cyclist

”

In consideration of contributing to a healthier environment and a healthier population, the future looks bright for cycling as a healthy option for outdoor sports and technology will keep improving the design, quality and make of the bicycle, to give us better experiences in cycling. Like any other solutions or products on the market, bicycles come in multiple ranges of specifications and prices, from the low and medium, to the highest ranges. Hence, it does not mean we will not be able to pedal well if we buy a lower-range brand because the strength comes from the legs that push the pedals and our cadence, ie in cycling terms, it means the number of revolutions per minute we complete at a given speed.

More and more people over 50 are embracing a healthier lifestyle, as reported, for example, by the National Health Service of England. In fact, a 2018 study suggests that cycling can ward off the effects of ageing and keep your immune system strong and found that the t-cells of older cyclists were generated as much as that of younger people. Studies from the King's College London and the University of Birmingham found that cyclists over 55 'has levels of physiological function that would place them at a much younger age than the general population'. These statements should be good enough to entice not just the 50s and above to get on the saddle and pedal, but people of all ages too.

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READY TO BATTLE








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Esports Gaming the Future of Sports

Esports is experiencing rapid growth within the gaming industry, driven by factors such as the ongoing digitalisation, increased smartphone usage and growing awareness of gaming. The advancement of technology has opened new opportunities in the field, and the demand for esports has been further fueled by the COVID-19 pandemic.

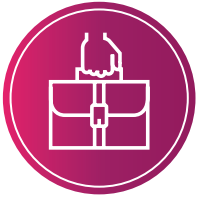
ESPORTS: SPOT THE DIFFERENCE

Esports	Key Difference	Sports
<ul style="list-style-type: none"> Primarily involve competitive video gaming Professional players or teams compete against each other in video games Form of organised, competitive gaming that often requires high-level skills, strategy and teamwork. 	<p>Nature of Competition</p> 	<ul style="list-style-type: none"> Mainly involve physical activities that require athletic ability and often involve direct physical competition between individuals or teams
<ul style="list-style-type: none"> Largely rely on mental agility, hand-eye coordination and reflexes Players use controllers, keyboards or other input devices to control their in-game characters 	<p>Physicality</p> 	<ul style="list-style-type: none"> Predominantly require physical fitness, endurance and the use of the body to perform actions like running, jumping, throwing or tackling
<ul style="list-style-type: none"> Tournaments often take place online or in large venues, with spectators watching the action unfold on screens or through live streaming platforms Viewers can interact with the game, follow player perspectives and listen to live commentary 	<p>Spectator Experience</p> 	<ul style="list-style-type: none"> Spectators attend live matches in stadiums or watch televised broadcasts, witnessing the physical prowess of athletes in real time
<ul style="list-style-type: none"> Have organised leagues, teams and governing bodies that regulate competitions, provide sponsorship opportunities and facilitate player contracts 	<p>Professional Structure</p> 	<ul style="list-style-type: none"> Traditional sports have long-established governing bodies, such as FIFA (soccer) or NBA (basketball), which oversee multiple leagues and teams, and often have complex structures including drafts, player transfers and player contracts
<ul style="list-style-type: none"> Esports and gaming have been historically perceived differently from traditional sports, but have gained mainstream recognition more recently Their popularity have been growing rapidly, with increasing acceptance and recognition as a legitimate form of competition, both by the gaming community and the broader public 	<p>Cultural Perception</p> 	<ul style="list-style-type: none"> Traditional sports, being deeply ingrained in many cultures, often hold a higher level of societal acceptance and recognition, with a long history of professional competition and widespread fan bases

INFOGRAPHIC

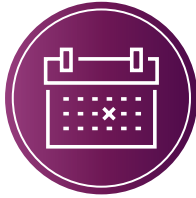
This growing market is characterised by the establishment of more teams, tournaments and companies, providing a wide platform for sponsorship and advertising. As a result, not only is the prize money for tournaments increasing, but also the investments being made in different teams, thanks to the rise in viewership through live streaming and the profitability of the industry.

There are five main factors that make up the esports ecosystem:



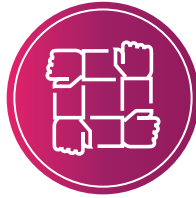
Publishers

Publishing eSport titles and creating the basis of their competitive environments



Events

The driving force of eSport's popularity, bread and butter of the industry's exposure



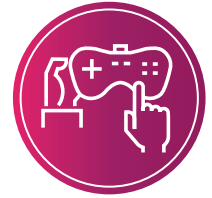
Teams

Creating brands, competing for glory and maximising their profits



Sponsors

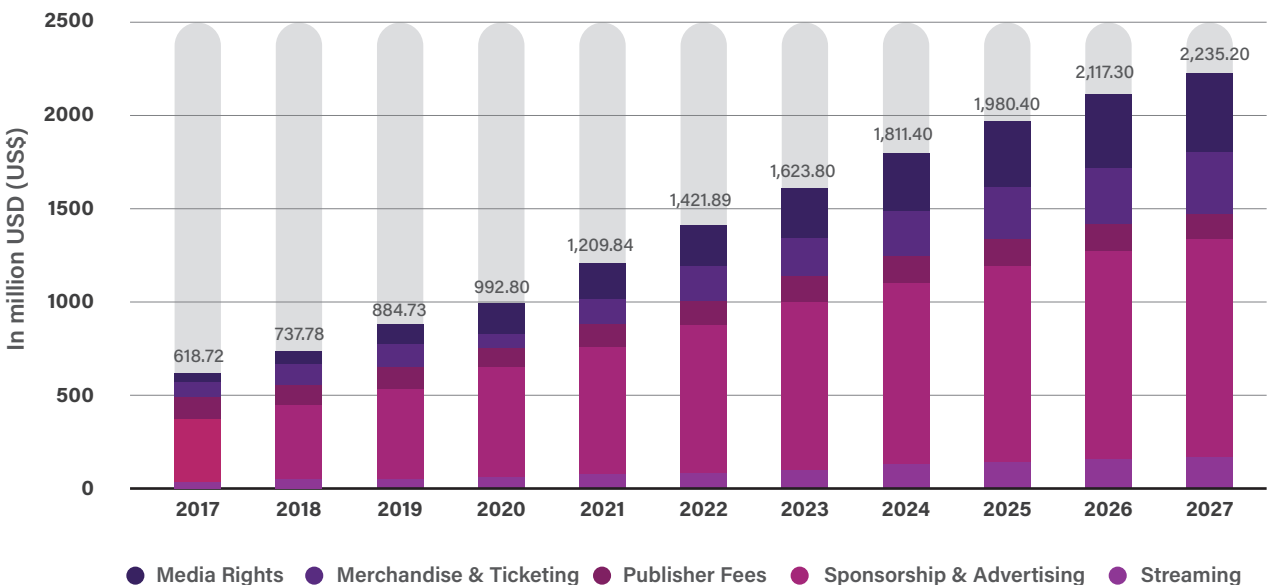
Financing events and teams, balancing out the industry and effectively selling their products



Players

Highly talented individuals doing all the hard work in the industry

China remains the largest market for esports, followed by the United States and Germany. Strong double-digit growth is expected in the esports market, especially considering recent consolidation within the gaming industry and the entry of FaZe Clan into the stock market, which has garnered additional attention and interest.

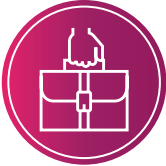


Notes: Data shown is using current exchange rates and reflects market impacts of the Russia-Ukraine war.

Most recent update: Apr 2023

Source: Statista Market Insights

EMERGING FACTORS DRIVING ESPORT



Publishers

Publishers act as driving forces in the esports industry by developing and promoting esports-centric games, organising tournaments and leagues, forging partnerships, and continuously supporting the competitive ecosystem. Their efforts contribute to the growth, sustainability and success of esports as a global phenomenon.



Sponsorship and Advertising

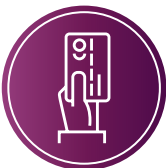
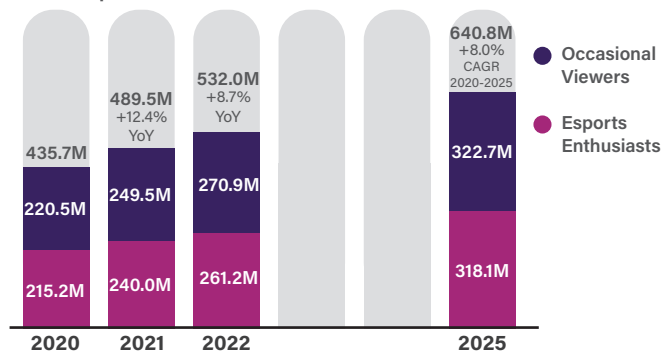
Digital and streaming platforms are experiencing rapid growth in terms of revenue generation within the esports industry. From 2020 to 2025, these two revenue streams are projected to have Compound Annual Growth Rates (CAGRs) of +27.2% and +24.8%, respectively. This upward trend can be attributed to the increasing awareness and popularity of digital assets and Non-Fungible Tokens (NFTs). As more people become familiar with the concept of digital ownership and the value of unique in-game items tied to esports Intellectual Property (IP), it is expected that investment and fan interest in acquiring these items will rise. This emerging trend not only has the potential to generate additional revenue streams for the esports industry but also enhances fan engagement and participation in the virtual ecosystem.



Streaming

Streaming platforms like Twitch, YouTube Gaming, and others provide a convenient and accessible way for fans to watch esports tournaments and events. These platforms have a global reach, allowing viewers from different parts of the world to tune in and engage with esports content. Talented gamers can stream their gameplay, interact with viewers and gain recognition within the community. This grassroots approach helps in discovering new talent and fostering the growth of the esports ecosystem.

eSport Audience Growth Global | For 2020, 2021, 2022, and 2025

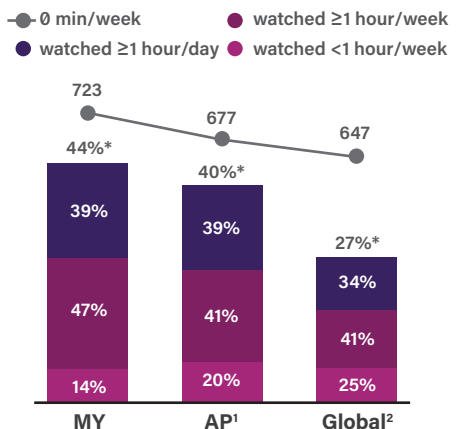


Merchandise and Ticketing

Merchandise refers to the sale of branded products associated with esports teams, players and events. It includes apparel (such as jerseys, hats and jackets), accessories (such as mousepads and keychains), collectibles and other branded merchandise. Merchandise drives the esports industry through fan engagement that allows fans to express their support and affiliation with their favorite teams and players. Merchandise sales provide a significant source of revenue for esports organisations and teams which can be used to fund player salaries, team operations and infrastructure development. While sponsorship and partnerships potentially serves as a valuable marketing tool for sponsors and partners.

In Malaysia, the term "esports" is recognised by 97% of the population, while 36% are familiar with its exact definition. On average, an esports viewer in Malaysia spends approximately 83 MYR per month on various esports-related items. This expenditure is primarily directed towards attending events, purchasing merchandise and accessing esports content.

eSport Audience Growth Global | For 2020, 2021, 2022, and 2025



*44%, 40% and 27% of the Singapore, AP and Global respondent group have watched professional esports competitions at least once during the past six months, respectively.



Media Rights

Media rights deals bring in substantial revenue for esports organisations and event organisers. Media companies, streaming platforms, and broadcasters pay significant amounts to secure the rights to broadcast esports tournaments and leagues. Media rights enable esports events to be broadcasted internationally, breaking down geographical barriers. Esports competitions can reach a global audience, attracting fans from various countries and regions.

Source : *Let's Play, Malaysia! Video gaming & esports 2022, Deloitte*

4 SELECTED EMERGING ELEMENTS IN ESPORT



Play-to-Earn

Play-to-Earn games are powered by blockchain technology, which enables the creation and exchange of digital assets that are scarce, verifiable, and owned by the players. It's like owning Bitcoin, except that you can use it in an ecosystem of a game to buy and sell in-game items, characters, features and more.



NFTs (non-fungible tokens)

Diversifying revenue streams is a crucial element that will shape the future of esports-focused non-fungible tokens (NFTs). Methods such as customised fan memberships are leading the path towards achieving this goal. Additionally, tools like token-gated access to exclusive behind-the-scenes content and interviews offer further opportunities to diversify existing revenue streams.



Cloud Gaming

Cloud gaming has the potential to significantly revolutionising how games are played, streamed, and accessed by players and audiences alike. Accessibility, scalability, spectator experience, cross-platform play, game and content distribution could drive esports growth.



Metaverse

The emergence of virtual sports events is becoming a feasible choice within the metaverse, and companies like Epic Games are already demonstrating the possibilities of such events. Additionally, the lifelike nature of virtual sports has the potential to transform augmented reality (AR) and virtual reality (VR) experiences for spectators.

To date, esports have proved its mettle as a sporting force to be reckoned with. Although very much different from the traditional sports as most of us know, esports are definitely raking in the money, following and fandom, as well as giving ample opportunities for collaboration and expansion.

So, the next time you see your child glued to the monitor screen with his fingers flying all over the mouse and keyboard, you may want to take a peek at which game and character he is playing, and get on board the excitement train as well.

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Reviving Athletic Excellence

Sports Rehabilitation in the Age of Advanced Technology

Sports and athletic competitions have been integral to various cultures, serving purposes such as entertainment, physical fitness, socialisation and even religious rituals. In tandem, the essential role of sports rehabilitation in the sports industry is being acknowledged as it helps athletes recover from injuries, prevent future injuries, enhance performance, extend careers, and promote overall athlete well-being. By providing specialised care and support, sports rehabilitation contributes to the long-term success and sustainability of the sports industry as a whole. The Global Sports Rehabilitation market value is projected to reach around USD 8 billion by 2026 from USD 5.78 billion in 2017, at a CAGR of +7% during the forecast period.



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INFOGRAPHIC

Sports rehabilitation has evolved significantly over the past, continues to evolve in the present, and holds promising developments for the future.

The history of sports rehabilitation can be traced back to ancient civilisations, where various forms of physical therapy and healing practices were used to treat injuries and enhance athletic performance.



ANCIENT CIVILIZATIONS

Ancient civilisations such as Egypt, Greece and Rome recognised the importance of physical activity and utilised techniques like massage, hydrotherapy and exercise to treat injuries and improve athletic performance. These early practices laid the foundation for later developments in sports rehabilitation.



19th CENTURY

In the 19th century, organised sports gained popularity and the need for specialised care for sports-related injuries became apparent. Orthopaedic medicine emerged as a field focused on the treatment of musculoskeletal conditions, including sports injuries. Physical therapy, also known as physiotherapy, began to develop as a profession during this time.



20th CENTURY

Development of Rehabilitation Programmes

During World War I and World War II, rehabilitation programmes were developed to treat injured soldiers, and the field of rehabilitation medicine expanded. Physical therapists started working with athletes, using exercises, therapeutic modalities and manual techniques to help them recover from injuries and improve their performance. Development of rehabilitation techniques including the use of therapeutic exercises, stretching, strengthening and conditioning programmes, as well as the application of heat, cold, electrical stimulation and ultrasound for pain relief and tissue healing.

Emergence of Sports Medicine

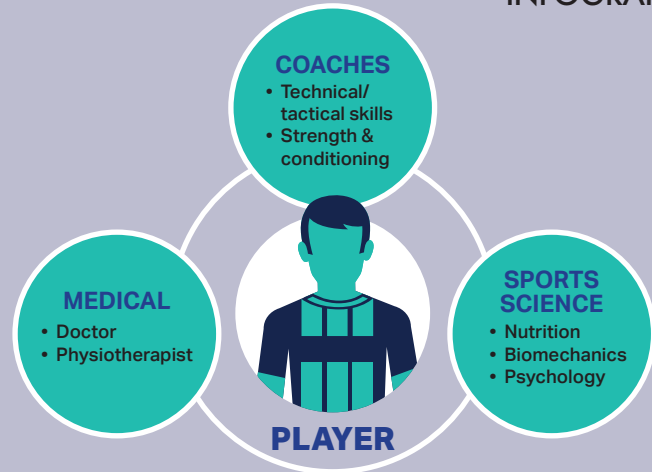
In the latter half of the 20th century, the field of sports medicine gained recognition as a specialised area of healthcare. Sports medicine professionals, including sports physicians, orthopedic surgeons, athletic trainers and physical therapists, collaborated to provide comprehensive care for athletes. Sports rehabilitation became an integral part of sports medicine, focusing on injury prevention, injury management and performance optimisation.

Advances in Technology

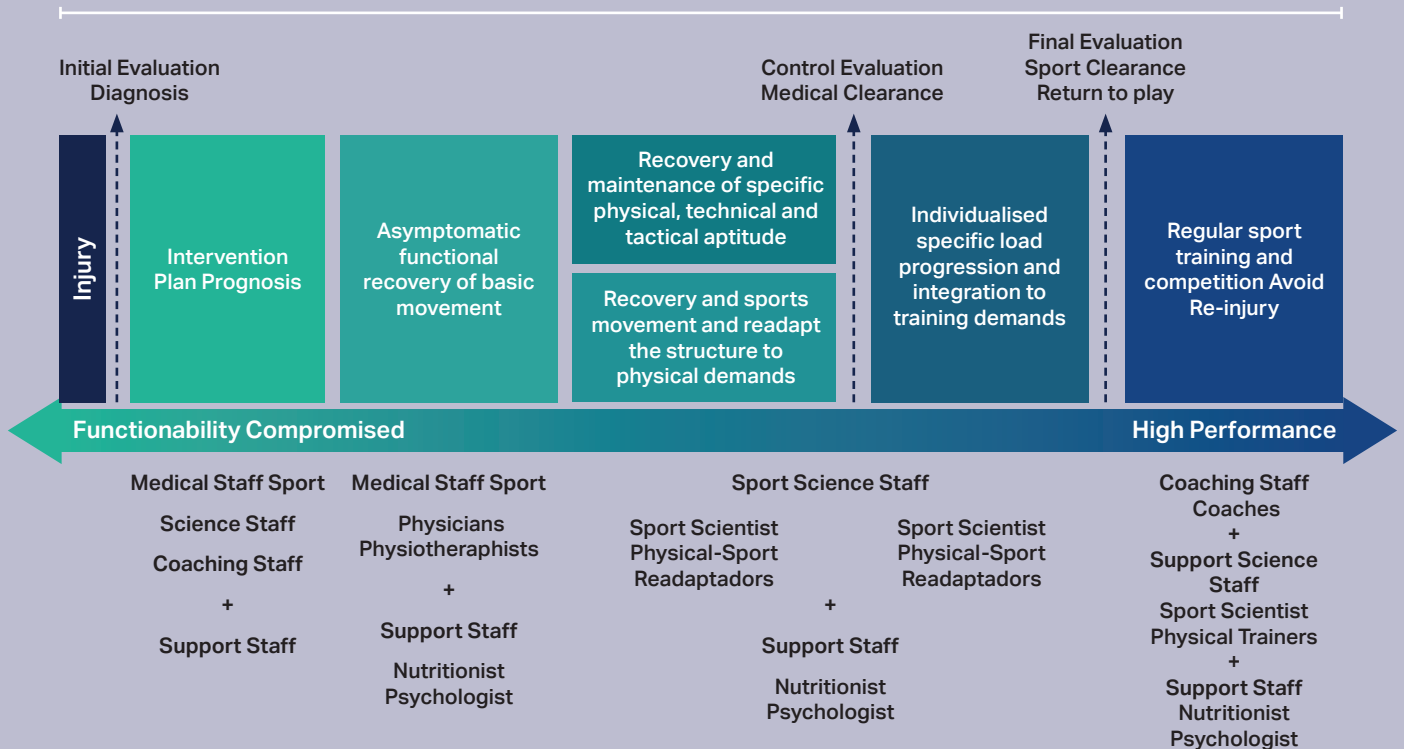
The late 20th and early 21st centuries brought significant advancements in technology that impacted sports rehabilitation. These included the use of modalities like cryotherapy and laser therapy, advancements in diagnostic imaging such as magnetic resonance imaging (MRI) scans, the introduction of biomechanical analysis tools and the integration of computer-based training programmes and virtual reality in rehabilitation. Biomechanics is the science of the movement of a living body, including how muscles, bones, tendons and ligaments work together to move.

Sports rehabilitation in the present has become more comprehensive and with evidence-based approaches. There is greater recognition of the importance of individualised treatment plans tailored to the specific needs of athletes. Rehabilitation professionals now employ advanced techniques, such as manual therapy, therapeutic exercises and functional training, to address the injury and underlying biomechanical imbalances and movement dysfunctions. The focus has expanded beyond just recovery and return to play to include injury prevention, performance optimisation and athlete well-being.

Present-day sports rehabilitation also emphasises a multidisciplinary approach, with collaborations between rehabilitation professionals, sports medicine physicians, athletic trainers, strength and conditioning specialists and other experts. The integration of technology, such as wearable devices and motion analysis systems, enables more accurate assessments, monitoring and tracking of athletes' progress and performance.



A multidisciplinary team approach to injury rehabilitation involves the use of a variety of individuals with different specialities.



Flow of interdisciplinary and multidisciplinary approach to sports injury recovery.

INTELLIREHAB - A Physiotherapy Rehabilitation Equipment Funded by Innovate UK and Newton Fund in Collaboration with MIGHT

At the national forefront, several academicians and companies in Malaysia and the United Kingdom work together to develop IntelliRehab, a physiotherapy rehabilitation equipment that was funded by Innovate UK and Newton Fund in collaboration with MIGHT. IntelliRehab, an intelligent medical system can offer customised exercises for personalised home telerehabilitation. Five organisations (MIRA Rehab Limited and Brunel University from the United Kingdom, while Proven Pac Sdn Bhd, Universiti Sains Islam Malaysia and Universiti Sains Malaysia from Malaysia) were involved in realising this project. This system combines state-of-the-art research in machine learning, sensor technology and advanced software engineering to develop a clinically validated, gamifying telerehabilitation tool, which is designed to improve the delivery of physiotherapy, benefitting patient recovery times, quality of life and cost reduction.

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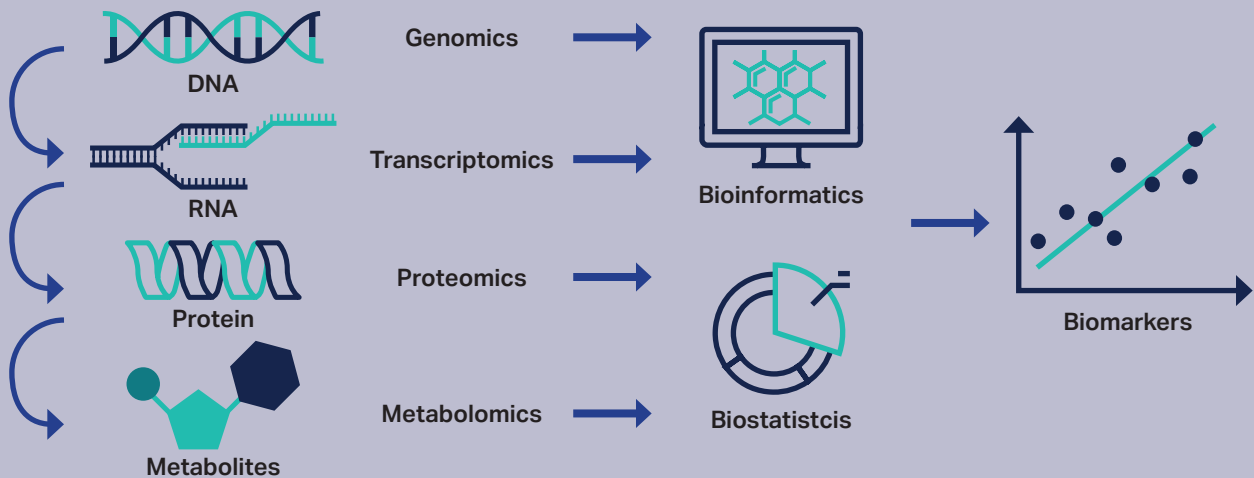
The future of sports rehabilitation holds great promises, driven by advancements in technology, research and development, and a growing understanding of the complexities of sports injuries. Technologies might decrease the occurrence rate, but accidents will still occur in the future. However, state-of-art diagnostics and appropriate rehabilitation tools could shorten the time of recovery and alleviate the pain along the way to feeling well again.

Some potential developments for future sports rehabilitation include:

Personalised Rehabilitation Programmes

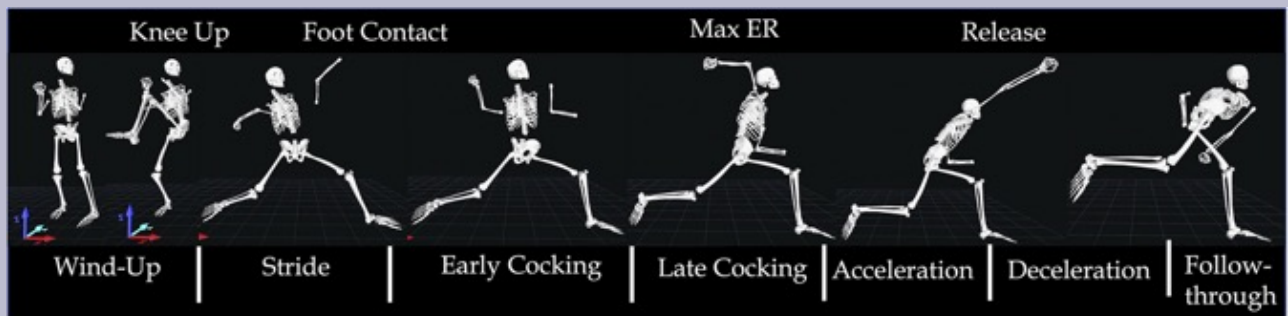
Advancements in genetic testing, biomarkers and AI-driven algorithms may enable the development of personalised rehabilitation programmes tailored to an individual athlete's specific needs, genetic predispositions and injury history.

A Multi-Omics Approach for the Discovery and Validation of Biomarkers



Advanced Biomechanical Analysis

Further advancements in motion capture systems, wearable sensors, and machine learning algorithms may enable more precise and detailed biomechanical analysis. This information can aid in identifying movement patterns, assessing injury risk, and refining rehabilitation interventions.

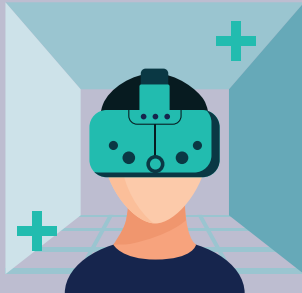


Virtual Rehabilitation

Virtual reality and augmented reality technologies are playing an auxiliary role in sports rehabilitation, providing immersive environments for rehabilitation exercises, improving motor learning and offering real-time feedback and monitoring. The results of virtual simulation training in sports such as soccer, sparring, Tai Chi and Taekwondo have been widely used in world competitions. While research suggests utilising VR (virtual reality) gaming technologies might assist with the treatment of neck and spinal injuries.

VIRTUAL REALITY (VR)

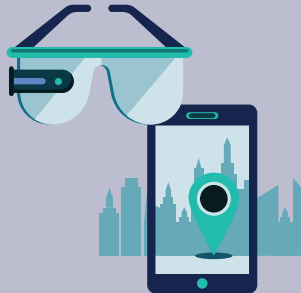
Completely digital environment.



Fully enclosed, synthetic experience with no sense of the real world.

AUGMENTED REALITY (AR)

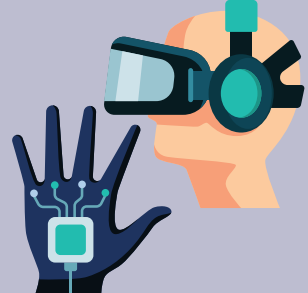
Real world with digital information overlay



Real world remains central to the experience, enhanced by virtual details.

MERGED REALITY (MR)

Real and the virtual are intertwined



Interaction with and manipulation of both the physical and virtual environment.

Virtual reality and augmented reality technologies are being used in virtual simulation training in sports.

Regenerative Therapies

Continued progress in regenerative medicine, including stem cell therapy, tissue engineering and gene therapy, offers new possibilities for promoting tissue healing, reducing recovery times and enhancing functional recovery.

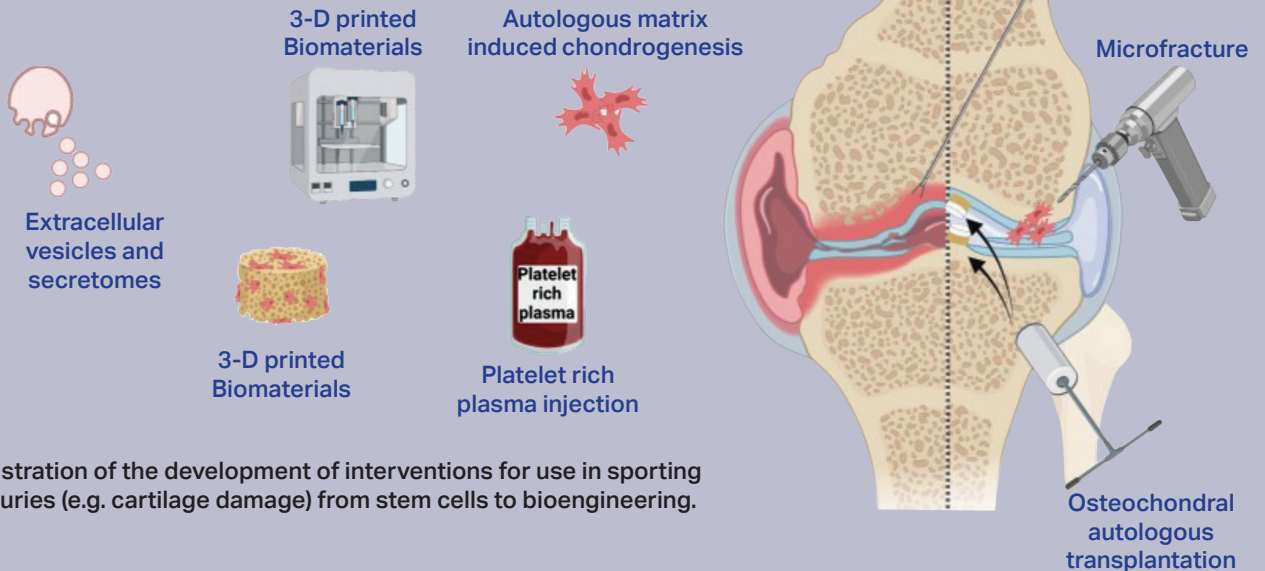


Illustration of the development of interventions for use in sporting injuries (e.g. cartilage damage) from stem cells to bioengineering.

Telerehabilitation and Remote Monitoring

Telerehabilitation, a method of delivering rehabilitation services using information, technology and communication to everyone, irrespective of their geographic location. Telehealth platforms and remote monitoring technologies may become more prevalent, allowing for remote consultations, exercise guidance and continuous monitoring of athletes' progress during their rehabilitation journey.



Telerehabilitation provides an innovative and cost-effective way for rehabilitative services to the athletes at their doorstep.

Mental Health Integration

The future of sports rehabilitation may include an increased focus on addressing mental health issues, such as anxiety, depression and stress, which can impact an athlete's recovery and performance. Collaborations with sports psychologists and the integration of mental health support within rehabilitation programmes may become more common.



It is important to note that while these potential developments hold promises, the future of sports rehabilitation will also be influenced by other factors such as research and development advancements, technological accessibility, regulatory considerations and the evolving needs and demands of athletes and sports organisations. Hence, we need to put our best foot forward to steer the future of sports rehabilitation.

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