DigiCycle

RESEARCH REPORT

DIGICYCLE

Co-funded by
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Authors

Grzegorz Botwina
Daniel Wojtyna
Hee Jung Hong
Dimitrios Kolyperas

Acknowledgements

With the collaboration of researchers from the European Network for Innovation and Knowledge, Foundation for Support of Polish Cycling, Danish Cycling Federation, German Cycling Federation, European Cycling Union and Royal Spanish Cycling Federation.

Project information

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About the Project

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What is DigiCycle?

DigiCycle stands for “Digital Innovation in Cycling”, and it is an Erasmus+ funded project created to understand how sport organizations, at different levels i.e. International Sport Federations, National Sport Federations, and Sport Clubs, are approaching digital innovation in the form of gaming and how such innovation is diffused. Innovation in this case is the use of sport gaming as a tool to promote sport, as a new way of enhancing participation and promoting physical activity.

Objectives

The intended outcome of the project is a model of successful diffusion of gaming as a tool for enhancing physical activity and increasing sport participation. The project has both scientific and practical implications, as it builds the body of knowledge in the field and aims to provide a clear roadmap for sport organizations to implement such sport enhancing gaming innovation.

1. **Understanding the link between participation in Zwift and cycling** – based on research. Achievement of this objective will be done by conducting research on at least 500 participants and analysis of the results using quantitative methods. Baseline – no research has been done in the field of cycling.
2. **Implementation of Zwift as a tool for enhancing participation in cycling in 4 countries**. Achievement of this objective will be measured by number of people reached by the activities. Baseline – none of the countries has systematic tools of using sport video games to promote cycling. The plan is to reach 1000 people in each country.
3. **Creating roadmap for National Cycling Federations to implement Zwift as a tool to enhance participation in cycling**. The objective will be measured by number of people familiar with the tool. Baseline – at present none of the federations use Zwift as a systematic tool to enhance participation in cycling. Target value is at least 300 people participating in MSEs, 500 downloads of Handbook and 300 people finishing the MOOC.

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Project Consortium

Foundation for Support of Polish Cycling (FSPC) has been established in 2015 by a decision of the Management Board of Polish Cycling Federation. The FSPC main goal is to support the development of cycling in Poland and to implement projects and programs with the aim of continuous growth of the sport in Poland and beyond.

The Danish Cycling Federation (DCF) is the Danish governing body for the sport of cycling. The Danish Cycling Federation is a member- and professional organisation representing both competitive and recreational riders.

German Cycling Federation (BDR) - As the association of the regional federations and their clubs, the BDR represents the interests of cyclists in the German Olympic Sports Federation (DOSB). In addition, the BDR is the right contact when it comes to questions of international cycling. The German Cycling Federation is also a member of the most important international cycling bodies (e.g. UCI, UEC).

The Royal Spanish Cycling Federation (RFEC) is the national governing body of cycle racing in Spain, founded in 1896. It covers the disciplines of road racing, track cycling, cyclo-cross, BMX, mountain biking and cycle speedway. The Federation is a member of the Union Cycliste Internationale and the Union Européenne de Cyclisme.

Union Européenne de Cyclisme (UEC), the European Cycling Union is the European confederation of national cycling bodies; the national federations of the Union Cycliste Internationale form confederations by continent. It is headquartered in Lausanne. The UEC is one of the 5 continental confederations which are members of the International Cycling Union (UCI). The UEC seeks to promote the interests of European cycling in all disciplines and to represent the interests of European cycling federations.

The European Network for Innovation and Knowledge (EUNIK) is a Foundation based in the Netherlands, but working internationally. EUNIK has been formed by higher education and R&D experts, with more than 15 years' experience working in the international field. The team at EUNIK has broad experience working at governmental, business, NGOs and Universities, which gives a perspective of how to approach the different goals and ways of working in those environments. With expertise in e-learning, digital change management and sport, the organization brings value to the projects it is involved in both in national and international scale.

1. Aim and Research Questions

As digital sports continue to gain prominence, understanding what motivates athletes to use Mixed-Reality (MR) sports platforms is becoming increasingly important. These platforms, which blend virtual and physical experiences, offer new ways for athletes to train and compete, making it essential to explore the factors that drive their adoption. Gaining insights into these factors is crucial for developing effective strategies that can enhance how athletes interact with and benefit from these innovative technologies.

This study aims to shed light on what influences athletes' decisions to use MR sports platforms, with a focus on Zwift, a popular indoor cycling platform. Zwift has become a significant example of how MR can transform training and competition by providing immersive and interactive experiences. By examining Zwift, the research seeks to identify key factors that impact athletes' intentions to use such platforms and their actual usage behaviors.

The core research question guiding this study is: **What factors influence athletes' intentions to use Mixed-Reality sports platforms**, and **how do these factors affect their actual usage of these platforms?** Answering this question will help in understanding the motivations behind platform adoption and usage, which can, in turn, inform the development of strategies to improve athlete engagement and overall experience with MR sports technologies.

2. Theoretical Background

The **digital transformation** of the sports industry has significantly reshaped how sports are conducted, experienced, and valued, unfolding in two main phases. The first phase, digitalization, integrated digital technologies into various aspects of sports, such as training, talent recruitment, refereeing, and fan engagement (e.g., Märtins et al., 2023). The second phase, virtualization, became especially prominent during the Covid-19 pandemic (Rojas-Valverde et al., 2022; Westmattelmann et al., 2021b). This era saw the rise of Mixed-Reality (MR) technologies, which created interactive and immersive sports experiences (Smith & Skinner, 2022). Early examples include events like the Virtual Olympic Series 2021 and the Virtual Tour de France, showing how traditional sports stakeholders are increasingly involved in virtual sports (Westmattelmann et al., 2021b).

Building on the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2; Venkatesh et al., 2012), this study explores what influences athletes' intentions and actual usage of MR sports platforms. Noting the discrepancies between intention and actual behavior in sports (Theodorakis, 1992), the study extends the UTAUT2 framework by adding three contextual factors—performance level, urbanization, and workload—as influences on actual usage behavior.

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3. Research Design, Methodology and Data Analysis

To address the research question, we investigate the adoption of MR sports platforms, using Zwift as a popular example. Zwift allows athletes to measure their performance using specific interface devices (smart trainers) and translate this data into a virtual world where they are represented by avatars. Beyond training, users can also compete in scheduled races against others or customize their virtual bikes.

This study adopts a Mixed-Methods approach following the guidelines provided by Venkatesh et al. (2013). This approach integrates both quantitative (Study I) and qualitative (Study II) research methodologies, facilitating a more comprehensive understanding of the research problem by leveraging the strengths of both methods. In Study I, we test our theoretical model on the adoption of MR sports platforms using survey and In-App Data from 515 Zwift users. For analysis, covariance-based structural equation modeling is utilized (Kline, 2023). In Study II, we conduct 20 semi-structured interviews with Zwift users and perform thematic analysis (Braun & Clarke, 2006) to corroborate the quantitative findings and provide deeper insights into user experiences.

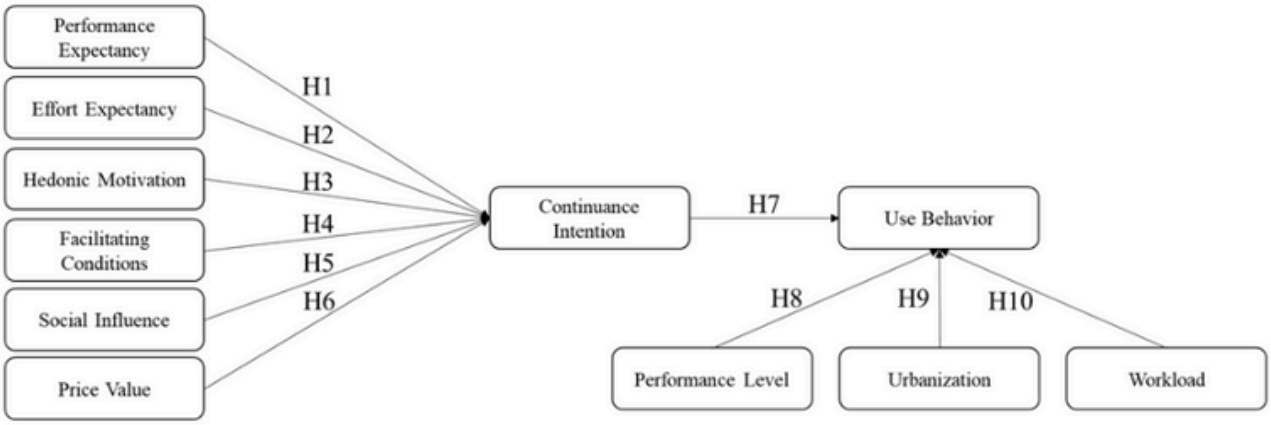
STUDY I
Quantitative Study

STUDY II
Quantitative Study

4. Research results

STUDY I - Quantitative Study

Research model



H1	Performance expectancy is positively related to users' intention to continue to use the mixed-reality sports platform.
H2	Effort expectancy is positively related to users' intention to continue to use the mixed-reality sports platform.
H3	Hedonic motivation is positively related to users' intention to continue to use the mixed-reality sports platform.
H4	Facilitating conditions is positively related to users' intention to continue to use the mixed-reality sports platform.
H5	Performance expectancy is positively related to users' intention to continue to use the mixed-reality sports platform.
H6	Social influence is positively related to users' intention to continue to use the mixed-reality sports platform.
H7	Price value is positively related to users' intention to continue to use the mixed-reality sports platform.
H8	Users' performance level increases its the actual use of the mixed-reality sports platform.
H9	Urbanization in the user's place of residence is positively related to the actual use of the mixed-reality sports platform.
H10	Users' workload increases its the actual use of the mixed-reality sports platform.

Method

The analysis utilized two sources of data: survey responses and platform usage metrics. The survey was distributed through ZWIFT community groups on social media. Out of 1,268 individuals who accessed the survey, 747 completed it. After a data cleaning process—removing 28 participants for failing an attention check, 188 for not having a verifiable ZWIFT account, and 16 for having completion times significantly outside the average—a final sample of 515 verified users was obtained. The average age of these participants was 40.14 years, with 83.1% being male, and the average ZWIFT level was 23.35.

To test the research model, covariance-based structural equation modeling (CB-SEM) was employed. The analysis integrated survey data with usage data. The sample size of 515 participants was deemed sufficient by comparing it to the minimum required sample sizes for two fit indices: RMSEA and Steiger's γ. The sample size surpassed the minimum requirements for both indices, ensuring the reliability of the results.

The survey used established scales from the UTAUT2 model, adapted for sports digitalization. It measured factors like performance expectancy, effort expectancy, hedonic motivation, facilitating conditions, social influence, price value, and continuance intention on a 7-point scale from 1 ("strongly disagree") to 7 ("strongly agree"). Workload was assessed by average weekly work hours, and urbanization was measured using the first three digits of respondents' ZIP codes to calculate population density. Use behavior was tracked by the total kilometers ridden on the platform in the past 30 days, and performance level was based on functional threshold power in Watts per kilogram of body weight, both collected from the platform a month after the survey. To avoid bias, the order of the survey items was randomized.

The constructs in the survey showed strong internal consistency, with Cronbach's Alpha values above 0.7. All constructs, except for Facilitating Conditions, had an Average Variance Extracted (AVE) greater than 0.5, indicating good reliability. The small deviation in Facilitating Conditions was not considered significant due to overall strong metrics and theoretical relevance. The Fornell-Larcker criterion was met, showing good discriminant validity, as the square root of each construct's AVE was greater than its correlations with other constructs. Additionally, cross loadings were lower than primary loadings, further supporting discriminant validity.

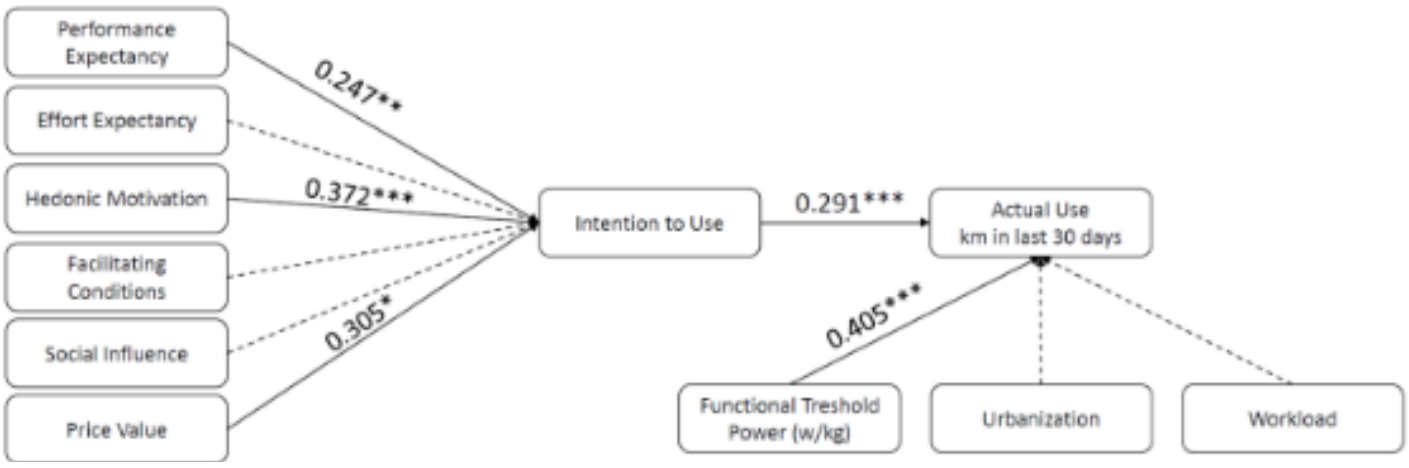
Results of Study I

The analysis used Confirmatory Factor Analysis (CFA) and CB-SEM with the 'lavaan' package in R. First, CFA was conducted to check if the measurement model fit well. This model included seven factors and 24 indicators. The model fit the data well, with strong results: a chi-square of 642.386, a chi-square/df ratio of 2.781, a Comparative Fit Index (CFI) of 0.951, a Tucker-Lewis Index (TLI) of 0.941, a Root Mean Square Error of Approximation (RMSEA) of 0.059, and a Standardized Root Mean Square Residual (SRMR) of 0.051.

After confirming the measurement model was accurate, the structural model was tested. The analysis showed that the model fit the data well, with strong indicators such as a chi-square of 464.773, CFI of 0.931, TLI of 0.920, RMSEA of 0.060, and SRMR of 0.079.

The results highlighted several important findings:

- Performance expectancy, hedonic motivation, and price value were all strongly linked to users' intention to continue using the platform. These factors supported hypotheses H1, H3, and H6.
- Effort expectancy, facilitating conditions, and social influence did not significantly impact users' intention to continue, leading to the rejection of hypotheses H2, H4, and H5.
- Continuance intention and performance level were both strongly associated with actual use behavior, supporting hypotheses H7 and H8.
- Urbanization and workload did not significantly affect actual use behavior, leading to the rejection of hypotheses H9 and H10.



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Results of Study I

Hypothesis		ß	SE	p	Assessment
H1.	Performance expectancy - Continuance intention	0.247	0.098	0.006	supported
H2.	Effort expectancy - Continuance intention	0.262	0.130	0.119	rejected
H3.	Hedonic motivation - Continuance intention	0.372	0.064	<0.001	supported
H4.	Facilitating conditions - Continuance intention	-0.179	0.247	0.333	rejected
H5.	Social influence - Continuance intention	0.033	0.026	0.670	rejected
H6.	Price value - Continuance intention	0.305	0,028	<0.001	supported
H7.	Continuance intention - Use behavior	0.291	50.199	<0.001	supported
H8.	Performance level - Use behavior	0.405	28.767	<0.001	supported
H9.	Urbanization - Use behavior	-0.308	0.045	0.603	rejected
H10.	Workload - Use behavior	0.061	1.851	0.407	rejected

Note. ß, standardized effect size; p, p-value.

STUDY II - Quantitative Study

The qualitative study analysis was based on thematic analysis, and its results are presented based on the outcomes of interviews with Zwift participants. The analysis is structured in a manner similar to the interview logic, which was derived from the quantitative part of the study.

Overall experience with Zwift

There may be many reasons for people to use Zwift, those can be intertwined or some of them can be dominant for particular users. In the analysis, the below reasons for use of Zwift were dominant.

1. Social Interaction: Users value the strong social component of Zwift, including the ability to give and receive kudos, engage in group rides, and connect with others. This social interaction helps them stay motivated and engaged, making indoor training more enjoyable.

2. Motivation and Engagement: The platform's interactive features and community support contribute significantly to users' motivation. The presence of friends and fellow cyclists, as well as the ability to participate in group workouts and races, keeps users committed to their fitness goals.

3. Convenience: Zwift offers the convenience of indoor training, allowing users to fit workouts into their schedules without being affected by weather conditions or other external factors. This flexibility is especially valued during winter or periods of unfavorable weather.

4. Entertainment and Distraction: Zwift provides entertainment through its gamified elements, such as leveling up and virtual racing. These features help distract users from the monotony of indoor cycling, making their workouts more enjoyable and less tedious.

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5. Integration with Training Tools: Users appreciate Zwift's integration with training tools like TrainingPeaks and Strava. This integration allows for structured training sessions and helps users track their progress more effectively.

6. Safety and Control: Zwift is perceived as a safer alternative to outdoor cycling, especially in adverse weather conditions. The platform also provides control over workout intensity and duration, which is beneficial for structured training.

7. Community Support: The supportive nature of the Zwift community, including encouragement and personal messages, enhances the user experience and contributes to a positive and motivating environment.

8. User-Friendly Interface: The ease of use and user-friendly interface of Zwift make it accessible to a broad range of users. The platform's design and functionality are appreciated for their simplicity and effectiveness.

9. Flexibility: Zwift allows users to train at any time, offering flexibility that is particularly useful for balancing workouts with family and other commitments.

Users choose Zwift for its strong social component, which includes giving and receiving kudos, joining group rides, and connecting with others, enhancing their indoor cycling experience. Motivation and engagement are significantly boosted by interactive features and community support, helping users stay committed to their fitness goals. Zwift offers convenience by allowing users to train indoors regardless of weather, which is particularly valuable during adverse conditions.

"In the first few years, I used Zwift for some training sessions, like the FTP Booster program. In the following years, 2020 and 2021, I switched to an external training plan created by my personal trainer. It looks like it's been five years already. Perhaps all of them were important, but the most crucial thing is staying fit during the winter, preparing for the spring season, and the social aspect, especially this year."

The platform's gamified elements provide entertainment and distraction, making workouts more enjoyable. Integration with training tools like TrainingPeaks and Strava helps users structure their training and track progress. Zwift is perceived as a safer alternative to outdoor cycling, providing control over workout intensity and duration.

The supportive Zwift community contributes to a positive and motivating environment. Additionally, Zwift's user-friendly interface makes it accessible to a wide range of users. The flexibility to train at any time fits well with users' schedules, allowing them to balance workouts with other commitments. Overall, Zwift blends social interaction, motivation, convenience, entertainment, and effective training integration to enhance the indoor cycling experience.

Performance and life quality

Based on users' experiences, Zwift has affected their life quality and performance in a number of ways. The below list shows the major groups of factors that interviewees mentioned.

1. Mental Relaxation:

Zwift provides a valuable mental break from work, helping users to destress and feel more relaxed after a session, which boosts productivity and energy levels.

2. Convenience and Time-Saving:

Zwift makes it easier to fit workouts into busy schedules by eliminating the need for outdoor preparations, thus saving time and allowing more flexibility in daily routines.

3. Family Time:

Users find that Zwift helps them balance family responsibilities with personal fitness goals, allowing them to train at home while spending quality time with their families.

4. Enhanced Fitness:

Regular use of Zwift has led to significant fitness improvements for users, including weight loss and improved cardiovascular health, contributing to a better overall quality of life.

"Well, it helps with my training, so it also benefits my overall health. Since I started using Zwift, I've lost around 10 kilos. My cardiovascular health has improved to the point where I'm surprising the doctors with my low heart rate, which makes for some amusing interactions. It has definitely pushed me to become more organized. It's really convenient that you can ride whenever you want, regardless of the time of day or the weather outside. But you don't want to train 5 minutes before bedtime, so some family organization is necessary. Of course, the ease of using Zwift in terms of equipment setup, software navigation, and the space required to set it up is a big advantage."

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5. Structured Training:

Zwift's integration with training plans and tools helps users organize their workouts effectively, improving their fitness routines and supporting their training goals.

6. Social Interaction:

Zwift enhances social connections by enabling users to join group rides, races, and virtual events, fostering a sense of community and providing social support.

7. Safety:

Zwift offers a safer alternative to outdoor cycling, especially during bad weather, reducing the risk associated with outdoor rides and providing a controlled environment for workouts.

8. Productivity Boost:

Engaging in Zwift sessions helps users to clear their minds and return to work or other responsibilities feeling refreshed and more focused.

9. Flexibility in Training:

The ability to train at any time of day, including late at night, adds flexibility, allowing users to integrate workouts seamlessly into their schedules.

10. Entertainment:

The gamified aspects of Zwift, such as racing and personal best challenges, make workouts more enjoyable and less monotonous, enhancing overall satisfaction.

11. Convenient Setup:

Zwift's user-friendly interface and easy setup make it accessible, reducing the hassle associated with organizing and conducting indoor workouts.

12. Personal Challenge:

The competitive elements and structured challenges in Zwift motivate users to push their limits and achieve personal fitness milestones.

13. Improved Mental Health:

For some users, Zwift serves as a crucial tool for managing mental health, providing a productive and enjoyable outlet for stress relief.

14. Adaptability:

Zwift accommodates varying training needs and schedules, allowing users to adjust their workouts based on personal preferences and time constraints.

15. Community Engagement:

Active participation in Zwift's community, including leading group rides or races, contributes to a sense of purpose and involvement beyond individual workouts.

16. Health Monitoring:

Users benefit from the ability to monitor their health metrics and progress through Zwift's integration with health tracking tools.

17. Convenient Training:

Zwift's convenience allows users to fit in workouts even during busy or unpredictable schedules, such as during work-from-home days or family time.

18. Reduced Barriers to Exercise:

By providing an indoor training option, Zwift eliminates common barriers to exercise like inclement weather or unsafe outdoor conditions.

19. Motivational Tools:

Features such as personal achievements and virtual competitions keep users motivated and engaged with their fitness goals.

20. Efficiency:

Zwift improves the efficiency of workouts by providing structured plans and tools that help users maximize their training time and efforts.

Zwift has significantly improved users' lives across several dimensions, including their daily routines, quality of life, productivity, fitness, and socialization. Firstly, Zwift offers a valuable mental break from work, helping users destress and feel more relaxed after a session. This relaxation boosts productivity and energy levels, making it easier to handle work and daily responsibilities.

"It's easier to use Zwift because it's not as time-consuming. If you wanted to go outside in this kind of weather, it would take much longer. So with Zwift, I can fit in a workout or some activity in a shorter amount of time, which leaves me with much more time for my family."

The convenience of Zwift is a major advantage, as it allows users to fit workouts into their busy schedules without the need for outdoor preparations.

This time-saving aspect means users can seamlessly integrate exercise into their day, leaving more time for other activities, including family responsibilities. By enabling training at home, Zwift helps users balance their fitness goals with family time, which many find crucial.

Fitness improvements are another significant benefit of Zwift. Users have reported weight loss, improved cardiovascular health, and better overall quality of life due to regular use. Zwift also supports structured training, integrating with various tools and plans to help users organize their workouts more effectively and achieve their fitness goals.

Social interaction is enhanced through Zwift's community features, such as group rides, races, and virtual events. These social elements foster a sense of community and provide valuable support and motivation. Additionally, Zwift offers a safer alternative to outdoor cycling, especially during adverse weather conditions, reducing risks and providing a controlled environment for workouts.

Zwift also contributes to improved productivity. Engaging in Zwift sessions helps users clear their minds, allowing them to return to work or other responsibilities feeling refreshed and more focused. The platform's flexibility in training times, including late-night sessions, allows users to fit workouts around their schedules, making it easier to maintain a consistent fitness routine.

The entertainment value of Zwift, with its gamified elements such as racing and personal challenges, adds enjoyment to workouts and reduces the monotony often associated with indoor exercise. Its user-friendly interface and easy setup further enhance its accessibility, making the overall experience more enjoyable.

Personal challenges and competitive aspects of Zwift motivate users to push their limits and achieve fitness milestones. For some, Zwift serves as a crucial tool for managing mental health, offering a productive outlet for stress relief. The platform's adaptability allows users to tailor their workouts to their preferences and schedules, providing a convenient and efficient exercise solution.

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Effort expentancy

Based on the responses about effort expectancy with Zwift, several factors can be noticed:

1. Overall Ease of Use

Users generally find Zwift easy to use, with most mentioning straightforward setup and operation. Many appreciate the user-friendly interface and the convenience of using Zwift compared to traditional gym workouts or outdoor cycling.

Challenges and Adaptations 2.

While Zwift is largely considered user-friendly, some users face specific challenges. Issues such as syncing devices, internet connectivity, and hardware setup can complicate the experience. For instance, users have reported difficulties with connecting power meters, dealing with intermittent internet issues, and integrating various training tools.

3. Hardware and Setup

The initial setup of Zwift, including connecting equipment like smart trainers and configuring the app, is seen as manageable by most users. However, the complexity of the setup can vary depending on the type of equipment used and individual technical familiarity. Users with more advanced setups, such as multiple sensors or specific trainers, may encounter more difficulties.

Learning Curve 4..

Some users experience a learning curve, especially with navigating the app's features or integrating Zwift with other training tools. Over time, most users become more comfortable and proficient with the platform, often finding that their initial struggles ease as they gain experience.

5. Impact on Time Management

Zwift's ability to facilitate quick and convenient workouts is highly valued. Users appreciate the time saved by avoiding gym visits and appreciate the flexibility of training at home, which helps them better manage their schedules and integrate exercise into their daily routines.

6. User Adaptations

Users have adapted their setups and practices to better fit their needs, such as using different devices or modifying their training environments. These adaptations often lead to a more streamlined and satisfying experience with Zwift.

"In the winter, Zwift is my go-to sport. I don't go to the gym because I'm a motorbiker, and I just don't enjoy gym workouts. I really appreciate being able to go to my "pain cave," change clothes, and be ready to Zwift in just five minutes. There's no need to drive to the gym, shower, and go through all the hassle, so Zwift in the winter is something I truly value.

I've seen progress or at least maintained my fitness level, give or take a few percent. This motivates me to stay fit.

At work, I've definitely noticed some changes. As a product management manager, I often have very stressful days or projects. So your question about whether Zwift helps with productivity is spot on. Zwift really helps me lower my stress levels. Whether I'm riding on Zwift or motorbiking outdoors, it helps a lot in reducing stress and keeping my mind on a different, more relaxed level. It's a great way to disconnect from work and feel free."

Overall, users find Zwift easy to use and appreciate its convenience, with most enjoying the straightforward setup and operation. However, some face challenges with device syncing, internet issues, and integrating various training tools. Despite a learning curve for certain features, users generally adapt over time and value Zwift for its time-saving benefits and flexibility in managing workouts.

Social Influence

The theme above is related both to how people started their activity at Zwift, but also how it is related to building or maintaining social connections. The below factors were apparent in the interviews:

1. Discovery and influence

Many users learned about Zwift through social channels like Strava, Facebook, and recommendations from friends or colleagues. Users often influence others to try Zwift based on their own positive experiences or through direct recommendations.

2. Social Integration

Zwift has facilitated social connections in multiple ways:

Community Building: Users join Facebook groups, local clubs, and other online communities to organize and participate in group rides or workouts. These interactions help users build relationships both virtually and in real life.

Social Interaction on Zwift: Features like group rides, chat functions, and virtual events enable users to interact with others in the Zwift environment, creating a sense of community and support.

Real-Life Connections: Some users transition from virtual interactions to real-life connections, meeting other Zwift users in person for cycling events or casual rides.

3. Influence and Motivation

Zwift users often influence others to join the platform and participate in activities. Social interactions, such as competing in events or joining group rides, help maintain motivation and provide encouragement.

4. Communication Channels

Zwift users leverage various communication tools including Facebook, Instagram, WhatsApp, and Strava to stay connected, share experiences, and organize events.

5. Social and Emotional Benefits

Zwift helps users find motivation and community support, especially during the winter months when outdoor cycling is less feasible. It also provides a platform for users to engage with like-minded individuals and foster new friendships.

"I've influenced others too. My colleague, who I frequently train with during the outdoor season, has started using Zwift now. I was initially influenced by the presenters from GCN. Around me, most people who ride bikes still don't see Zwifting as real cycling—they think of it as something online and foreign. But for us, it was just another tool to train together or to train in general.

Zwift has really helped me over the past two seasons. I've participated in national events, and last year, I did it alone with some friends occasionally joining me. This year, I participated with an entire team, and we were organized enough to strategize together."

Zwift users often discover the platform through social media and recommendations from friends. They frequently influence others to join based on their own positive experiences. Zwift supports social integration by enabling users to connect through Facebook groups, local clubs, and online communities, and facilitates interaction through group rides, chat functions, and virtual events. These interactions sometimes lead to real-life connections. Users leverage various communication tools like Facebook, Instagram, and WhatsApp to stay connected and organize activities. Overall, Zwift helps users maintain motivation, find community support, and foster new friendships, particularly during the winter months when outdoor cycling is challenging.

Virtual Vs Physical

When asked about the relation of virtual to physical cycling, the interviewees mentioned several factors:

Complementary Nature:

- Zwift complements rather than replaces traditional cycling.
- Zwift is particularly useful during the winter months when outdoor cycling conditions are less favorable.

Convenience and Training:

- Zwift offers the convenience of indoor training without weather-related interruptions.
- It helps maintain fitness and training levels during winter, contributing to better performance in outdoor cycling when the weather improves.

Enjoyment and Sensory Experience:

- Traditional cycling is preferred for its engaging and sensory experience, which Zwift cannot fully replicate.
- The enjoyment of traditional cycling is associated with real-world elements like weather and terrain, which adds to its appeal compared to Zwift's controlled environment.

Seasonal Participation:

- Cyclists use Zwift during colder months and switch to outdoor cycling when the weather improves.
- Zwift can be addictive due to features like group rides and competitions, but outdoor cycling is valued for its physical and emotional benefits, such as fresh air and real-world challenges.

Overall Value:

- Zwift serves as a practical and motivational tool for off-season training.
- Traditional cycling is preferred for its richer sensory experience and engagement, making both activities valuable in different contexts.

Participation in Zwift complements traditional cycling rather than replacing it. Zwift is particularly useful during the winter months when outdoor conditions are less favorable. Users appreciate Zwift for its convenience and the ability to train indoors without weather-related interruptions, while outdoor cycling offers a different, more engaging experience. Many users find that Zwift helps maintain fitness and training levels during winter, translating into better performance when they return to outdoor cycling in better weather.

"In my opinion, Zwift helps you better understand your performance and your body's available energy. It's easier to evaluate yourself on Zwift—not just through FTP tests, but also by observing how long you can climb, how much you can push, and when you need to stop. When you take this knowledge outdoors, you already have a good sense of your limits.

I cycled a lot before Zwift, so Zwift is more of a tool for when I can't ride outside, but it has given me valuable insights into my performance, which has improved my outdoor cycling. It's about knowing when to stop and understanding your body's signals.

So, would you say that Zwift and outdoor cycling complement each other rather than being separate activities? Yes, definitely. After a month on Zwift, I start to miss riding outside. Eventually, I need to get outdoors. After about 8 weeks straight, Zwift can start to feel boring and frustrating, even with the challenges and new content. Staring at a screen becomes tough to handle, and I crave the outdoors. But then, after a long summer of outdoor cycling, I start to appreciate Zwift again.

These days, I mix things up a bit. As an adult cyclist, I find that with Zwift, I can regularly participate in social rides, races, or events that Zwift organizes. In real life, I don't do these things very often because they're not very common in my area."

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Facilitating Conditions and Price/Value

Cost and Value:

Subscription Cost:

- The subscription fee for Zwift can be considered high relative to some local incomes, yet many users find it worthwhile for the benefits it provides.
- Zwift is generally seen as good value for money, especially when compared to the cost of participating in outdoor cycling events.
- Discounts or lower subscription rates during the summer months could make Zwift more appealing for those who use it less frequently in warmer weather.
- Overall, Zwift is viewed as a good investment, given its training benefits and entertainment value.

Equipment Costs:

- Initial costs include purchasing an indoor trainer, which can vary widely in price.
- While basic equipment for Zwift is relatively affordable, advanced setups, such as direct drive trainers, can be quite expensive.

Technical Issues:

Connection Issues:

- Users may encounter technical problems such as connection dropouts and Bluetooth issues, which can affect their Zwift experience.

Equipment and Space Requirements:

Space Needs:

- Setting up Zwift typically requires a dedicated space, with the amount of space needed varying based on the complexity of the setup.
- A full Zwift setup, including trainers, fans, and display screens, may require substantial space.

Technical Setup:

- Proper setup requires compatible equipment, such as a suitable computer or tablet.
- A more comprehensive setup, involving additional equipment like cooling fans and advanced trainers, enhances the Zwift experience but requires more space.

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The overall cost and value of Zwift include both subscription fees and equipment costs. The subscription fee, while considered high by some, is generally viewed as good value for the benefits it provides compared to the cost of outdoor cycling events. Equipment costs vary, with basic setups being affordable, but advanced configurations requiring significant investment. Users did not see any major technical issues influencing their experience with Zwift.

"For me, the cost of a Zwift subscription is reasonable, especially when you compare it to the cost of participating in outdoor events. Just one or two events outside can cost the same as a month of Zwift, so the subscription isn't expensive when you think of it that way.

I usually opt for the monthly payment plan. Living in Poland, we have cold winters, so it's easy to keep my indoor space at 12–15 degrees Celsius, which is comfortable for riding. When it's around 20 degrees outside, I still prefer to cycle outdoors. But despite that, I've managed to log around 6,000 kilometers on Zwift over the course of probably six to eight months."

"It's very affordable and certainly not the main cost. The equipment for training isn't too expensive either—you can start with almost any trainer. However, if you want to take it to a higher level, the costs can rise significantly. You'll need to invest in a trainer with verified parameters, direct drive, and auto-calibration. Plus, you'll need several fans to keep cool, which all adds up.

So while general use and training on Zwift are quite affordable, top-level racing can get expensive. It's definitely nice to have some dedicated space for it, and that's something everyone strives for when they have the opportunity."

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User Attributes

This theme revolves aroud cycling and its role according to users and their participation in other sports. The below factors were mentioned by the interviewees:

1. Enhanced Fitness: Cycling is a great way to improve cardiovascular fitness and endurance. It helps in building stamina and can be a beneficial form of exercise for overall health.

2. Recovery and Rehabilitation: Cycling is often used as a low-impact exercise for recovery from injuries or surgeries. Its gentle nature makes it suitable for rehabilitation, allowing individuals to stay active while avoiding excessive strain on the body.

3.Cross-Training: Many athletes use cycling as a form of cross-training. It provides a break from their primary sport while still delivering a solid workout. Cycling helps in developing different muscle groups and improving overall physical conditioning.

4. Warm-Up and Conditioning: Cyclists often use cycling as a warm-up for other sports, or as part of their conditioning regimen. It can enhance performance in sports that require endurance and leg strength.

5. Complementary Training: For those who engage in multiple sports, cycling can serve as a complementary activity. It supports overall fitness and can help in balancing different types of training by providing aerobic exercise while reducing the risk of overuse injuries.

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"Cycling makes up about 95% of my training time. I use the gym to support my cycling and rowing activities, mainly to prevent issues that may arise and to strengthen my legs and upper body to keep them in good shape. Recovery is crucial for cycling, so it's something I've gotten used to, especially when it comes to low-intensity training, which helps me manage different speeds while maintaining the same power. Longer, harder intervals on Zwift are beneficial because you don't have to worry about traffic or cars, and during those intervals, you don't want to be interrupted or obstructed in any way. It definitely helps. I'm trying to incorporate intervals on Zwift and then continue the rest of my training outdoors."

Useers consider cycling as a versatile and valuable exercise that enhances overall fitness and complements other sports. It improves cardiovascular health and endurance, supports recovery from injuries, and serves as effective cross-training. Cycling can be used for warm-ups, conditioning, and as a reliable indoor exercise option, thanks to platforms like Zwift, ensuring consistent training regardless of weather conditions. Its adaptability makes it a key component of a well-rounded fitness routine.

"It makes sense, especially if you live in a place where the weather plays a significant role. For example, I live in Scotland, and the weather here can be quite challenging. It's not really the cold that's the problem, but the wind. We get a lot of wind, and it often blows directly in your face, making the cycling experience much less enjoyable."

Environmental Attributes – Weather, urbanization, topography

Weather Conditions:

- **Extreme Cold:** Cycling in extreme cold can make outdoor riding uncomfortable or impractical, leading many to use indoor platforms like Zwift.
- **Snow:** Snow can make roads unsafe and cycling uncomfortable. Many cyclists turn to Zwift during snowy conditions to avoid dealing with poor road conditions and low temperatures.
- **Rain:** Rain can also make outdoor cycling less enjoyable or unsafe, prompting cyclists to use Zwift to stay dry and maintain their training routine.
- **Wind:** Strong winds can impact the cycling experience, particularly in regions prone to severe wind conditions.
- **Off-Season Cycling:** During off-seasons or adverse weather conditions, Zwift allows cyclists to maintain their training regimen indoors, ensuring they stay on track with their fitness goals despite the season.

Urbanization:

- **Traffic:** In urban areas, heavy traffic can pose safety risks and affect the enjoyment of outdoor cycling. Zwift is used as an alternative to avoid the hazards and inconveniences of busy roads.
- **Road Quality:** Poor road surfaces in cities can be problematic for outdoor cycling.
- **Speed limits and cycling paths:** sometimes the speed limits including those on cycling paths are restricting the capacity of training.

Topography:

- **Flat Terrain:** In areas with predominantly flat terrain, Zwift is utilized to simulate more challenging conditions such as hills and mountains that are not available locally.
- **Hills and Mountains:** For those living in regions with limited access to hills or mountains, Zwift helps replicate these conditions, allowing for effective training even when local terrain does not meet their needs.
- **Simulating Conditions:** Zwift's ability to simulate various terrains, such as mountains and hills, is highly valued by cyclists who lack local access to these conditions. This feature helps them achieve specific training objectives despite geographic limitations.

"Some people switch to road cycling in the spring and summer, but for me, it's a safety thing. I know I can complete a specific session without worrying about weather conditions like wind or rain, traffic, or poor road surfaces. That's why I cycle indoors all year round. When summer comes, I might need to use a couple of fans in the room because it gets quite hot.

Cycling plays a significant role in relation to other sports. Some people, for instance, jog or do both, while others use cycling as a warm-up for a different sport. It's convenient for both loading and off-loading, and it's also great for group rides on weekends. I often use the canal towpath because it's traffic-free and quick to access. Occasionally, I might ride all the way to Edinburgh and take the train back, or vice versa. The area where I live has a good mix of hills and flat roads, so there's a lot of variety in terrain. You can also simulate many mountains, hills, and courses on Zwift, which is great."

Living conditions and weather significantly affect cycling routines. Many users find that their location influences their cycling habits, particularly in areas with harsh winter conditions or challenging weather. For instance, in places with extreme cold, snow, or rain, cycling outdoors can be impractical or unsafe. In urban areas, cycling might be limited by traffic and road quality, while those in flat or less varied terrains might use Zwift to simulate more challenging conditions.

New Outcome Phenomena

Based on the provided text, here is an overview of how users interact with Zwift and related platforms:

1. Frequency and Platforms:

- Users engage with cycling content and Zwift across various platforms. Commonly used platforms include Facebook, Instagram, and Strava. Some users also explore LinkedIn and other cycling-specific forums. These platforms are utilized for both sharing cycling experiences and staying connected with the cycling community.
- Users often integrate Zwift with other training software, such as Strava, to track and analyze their performance.

2. Continued Use and Experience:

- Many users express a positive outlook on continuing to use Zwift due to its benefits in maintaining fitness during adverse weather and off-seasons. Zwift's role in providing an indoor alternative during bad weather or when outdoor cycling isn't feasible is appreciated.
- Zwift is seen as a valuable tool for its entertainment factors, social interaction, and gamification aspects. Users enjoy the challenge of virtual racing, leveling up, and competing with others, which adds a game-like element to their workouts.

3. Motivations for Using Zwift:

- Users are motivated by the ability to stay fit and healthy, especially when weather conditions make outdoor cycling difficult. Zwift's gamification features, such as tracking progress and achieving personal records, also contribute to user motivation.
- The social aspect of Zwift allows users to connect with other cyclists globally, fostering a sense of community and providing additional motivation.

4. Typical Usage and Sessions:

- A typical Zwift session often involves a structured workout or virtual race. Users engage in various training activities, including solo rides, group events, and challenges.
- Sessions are described as interactive and enjoyable due to Zwift's integration of social and competitive elements, which help users stay engaged and committed to their fitness goals.

Overall, users find Zwift to be an effective and enjoyable platform for maintaining their cycling routine, particularly in challenging weather conditions or during the off-season. Its integration of social interaction, gamification, and flexibility in training contributes to a positive overall experience.

"I definitely plan to keep using it, especially for the reasons we just discussed—training in bad weather, when time is tight, and so on. I enjoy the gaming aspect of it, like leveling up, beating my own records, and racing against others at a similar level. That's great, and honestly, I think platforms like Zwift could have a positive impact on society.

In Poland, there's a big discussion about how kids spend a lot of time gaming, leveling up in virtual worlds. In my opinion, platforms like Zwift connect those two worlds by encouraging people to stay fit while still enjoying gaming. It's a great way to promote fitness, although it can be expensive if you need to buy a full setup, including a bike and everything else, especially if you're starting from scratch.

Personally, I don't like going to the gym because I don't feel comfortable with people around me. While I support efforts to help people get back in shape, it might be challenging to convince the general public—not just those who are well-off—to invest in this kind of setup."

5. Discussion of Results

Study I results show that performance expectancy, hedonic motivation, and price value significantly influence users' intention to continue using the mixed-reality sports platform. Users are more inclined to persist with the platform if they perceive it as enhancing their performance, providing enjoyable experiences, and offering good value for money. These factors were found to be pivotal in maintaining user engagement.

Conversely, the study did not find significant effects of effort expectancy, facilitating conditions, and social influence on users' intention to continue. This indicates that the ease of use, available support infrastructure, and external opinions have less impact on user retention than anticipated in this context.

Furthermore, the research demonstrates a clear link between users' intention to continue and their actual use behavior. Those who express a strong intention to keep using the platform are more likely to engage with it actively. Additionally, users' performance levels on the platform are a significant predictor of their actual use. Higher performance levels correlate with greater engagement, suggesting that users who excel in their performance are more inclined to use the platform frequently.

However, the study found no significant relationship between urbanization or workload and the actual use of the platform. This suggests that factors related to geographic location and work demands do not substantially affect user engagement.

In summary, the findings underscore the importance of performance expectancy, hedonic motivation, and price value in influencing users' intentions to continue using a mixed-reality sports platform. They also highlight that actual usage is significantly driven by users' performance levels and their intent to persist with the platform.

Study II - qualitative analysis of user experiences with Zwift - highlights several key themes and insights into the platform's impact on cycling routines and overall life quality. Firstly, Zwift is highly valued for its strong social interaction features, such as giving and receiving kudos, participating in group rides, and connecting with a global community, which significantly enhances users' motivation and engagement. The platform's convenience is a major draw, allowing users to train indoors irrespective of weather conditions, which is especially beneficial during winter or adverse weather. Additionally, Zwift's entertainment value, driven by its gamified elements like virtual racing and personal achievements, helps alleviate the monotony of indoor workouts and keeps users engaged.

Users also appreciate Zwift for its integration with training tools such as TrainingPeaks and Strava, which aids in structured training and progress tracking. The platform's safety features offer a controlled environment for workouts, reducing risks associated with outdoor cycling. The user-friendly interface and flexible training options contribute to a seamless experience, making Zwift accessible and adaptable to various schedules.

Zwift's positive impact extends beyond fitness, contributing to mental relaxation, improved productivity, and better family time management. Users find that Zwift supports their fitness goals and enhances their overall quality of life by providing a structured, enjoyable, and social workout environment. Despite some challenges related to device syncing and technical setup, the overall value of Zwift is perceived as high, particularly when compared to the costs of outdoor cycling events and the benefits it offers.

Zwift effectively combines social interaction, motivation, convenience, and entertainment, making it a valuable tool for maintaining fitness and enhancing life quality. The platform's integration with training tools, safety features, and user-friendly design further solidify its role as a preferred choice for indoor cycling, especially in challenging weather conditions or when balancing various life commitments.

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