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Regulating technology, enabling participation: evaluating the impact of a new cycling racing class in the UK

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ABSTRACT

Purpose/Rationale: This study outlines the introduction of a new racing class in the sport of cycle time-trials in the UK which was implemented to address falling levels of participation. This case study follows up on this policy innovation by conducting a survey of its participants after two full racing seasons and investigates the perceptions of it by its participants.

Design/Methodology/Approach: An online survey was administered to cycling time trial participants ($n=801$). This survey utilised a traditional thematic analysis approach which was then further validated via an artificial intelligence-based process.

Findings: The findings found respondents' perceptions of the class matched that of its original concept by minimising the resources required to compete, increasing inclusivity and seeing a perceived avoidance or rejection of a technological "arms race". Respondents were also largely content with the current rules' content.

Practical Implications: Governing bodies should avoid rule changes that increase participant costs or accelerate technological arms races, as these were consistently identified as barriers. They should also actively promote the new racing class as equivalent in status through equal social media coverage, prize structures, and event branding to counter perceptions of it being a "second-class" category. Finally, they should enhance visible rule enforcement to maintain trust.

Originality/Value: This is a novel study which contributes to an emerging understanding of how regulatory design can be used to balance performance, accessibility, and participation within technologically evolving sports.

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KEYWORDS

Cycling; fairness; sports technology; participation; sport governance

Background

Competitive cycling occurs in many forms. Within the UK though, a popular form of competitive cycling is time-trialling. This is a sport which involves a cyclist completing a course in the fastest possible time (Whitfield, 2013).

The consistent format of national cycling time trials involves riders competing individually over several fixed race distances of 10–100 miles in length or using time constrained formats of 12 and 24 h in duration (Dyer et al., 2016), and are generally performed on open

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roads. These events have taken place using several distance or time-based formats since 1890 (Whitfield, 2013). The sport is regulated by a single governing body known as Cycling Time Trials (CTT). The CTT governance region spans England, Wales and Northern Ireland. The sport utilises a series of rules and regulations which govern conduct, operational constraints and its equipment. The bicycle a cyclist can use for time-trialling has naturally evolved over its long history and ultimately evolved from machines that were aesthetically synonymous with a contemporary bicycle to something increasingly specialised that utilises unique frame geometry, specialised wheel designs, and unique handlebars. This progression reflects what has been described as a technological “arms race”. This is whereby incremental innovation drives escalating equipment standards which can then reinforce inequalities between participants (Loland, 2009; Wolbring & Tynedal, 2013). An example of a contemporary time-triallist is shown in Figure 1.

According to the CTT’s annual report, the sport of UK-based time-trialling seen a decline in participation via a reduction in the number of annual total rides performed (CTT, 2025). Declining participation in sport has frequently

been linked to structural barriers such as cost, access, and infrastructure availability (Wicker et al., 2009). This highlights that participation is not solely a function of individual motivation but is also shaped by the structural conditions embedded within the sport itself. While large-scale causal data is lacking, anecdotal sources for the sports decline point to reasons including increasing open road traffic volume, a loss of event course, participants shifting their interests to other disciplines like indoor cycling, and increasing equipment costs (<https://www.time-triallingforum.co.uk>). Declining sports participation due to cost echoes a wider pattern of cost-driven disengagement. For example, recent evidence from Australia shows that participation costs have risen sharply in real terms over the past five years, with financial pressure disproportionately affecting lower-income, marginalised groups, and community clubs (Westerbeek et al., 2025). Notably, this body of work findings suggests that participation barriers are not simply a matter of absolute price but of both value and cultural impact (Westerbeek et al., 2025).

To address this decline in participation, a concept was drafted by this paper’s author in early 2023 to formally move the sport from its traditional ethos to establishing a new



Figure 1. A contemporary time-triallist. (Photo courtesy of Sheila Booker photography).

A person riding a bicycle. AI-generated content may be incorrect.

regulated, parallel, and separate racing class. The concept specifically detailed a new “road bike” racing class (RBC) in a separate category. A road bike is defined in this paper as a drop handlebar-based, spoked wheel bicycle that is aesthetically akin to those used in mass start participation events on the road or those used by professionals at events such as the Tour de France. A road bike typically has a higher aerodynamic drag due to its equipment design and riding position (Barry et al., 2015), so therefore moves at a lower cruising velocity but is more versatile in its potential uses.

From a sport management perspective, – i.e. an emphasis on the strategic and organisational choices governing bodies make to shape their sport’s structure and delivery, any rule and regulatory development represents a form of strategic intervention through which governing bodies actively shape the structure, priorities, and participant experience of their sport (Ferkins et al., 2005).

The primary rationale for the new Road Bike Class was: To encourage new participants who may not have access to a specific time trial bicycle, to attract new participants who compete in other forms of cyclesport to race time trials using their existing bicycle, and to provide the perception of aesthetically similar equipment between competitors. In summary, the colloquial description this paper’s author used was: *“race in a criterium Friday, a sportive on Saturday and a time trial on Sunday – all using the same bike”*.

Using different taxonomies to group competitors by qualities such as weight, size, or equipment is not inherently novel. The use of classification systems to group participants based on characteristics such as equipment or ability is well established in sport as a mechanism to promote fairness and meaningful competition (Tweedy & Vanlandewijck, 2011). The concept of hosting multiple racing classes within the same sport is also already undertaken in other sports such as sailing (Caraballo et al., 2019), motorsport (Lippi et al., 2007),

and boxing (Morton et al., 2010). However, the use of multiple race classes by individual riders was a new approach for the CTT. To approve such a change, any new rule or regulation is detailed within the CTT’s rules and regulations (<https://www.cyclingtimetrials.org.uk/handbook>). In the case of a new RBC, the proposed legislation was drafted in March 2023 and the current version is as follows:

- The competitor shall normally assume a sitting position on the machine. This position requires that the only points of support are the following: the feet on the pedals, the seat on the saddle, and the hands holding the handlebar, tops, drops, or brake hoods.
- The road bike must possess drop or flat handlebars. No tri-bars or clip-on bars are allowed. The minimum width of the handlebars must be 350 mm outside to outside at their widest point and 250 mm inside to inside minimum distance between brake lever hoods at their narrowest point. The maximum distance between the rearmost edge of the handlebar top and the foremost part of the brake lever (the “reach”) must be 240 mm. Handlebars must not be modified or cut down in any way.
- Both front and rear wheels must have at least 12 spokes each with a maximum rim depth of 90 mm.
- Helmets used in road bike category events must not cover any part of the ears, have a tear drop/ long “tail”, or be marketed as a time trial specific helmet. The helmet should not be modified in any way, but any features of the helmet (such as sliding vents or covers) can be used.
- Hydration storage is limited to the use of water bottles or cages mounted within the main triangle of the frame for events up to 30 miles.

It should be noted that the words, phrasing, and style were also driven by the requirement to utilise regulations which could be

implemented by the CTT sports event organisers (who are typically volunteers) without the need for specialist training or equipment.

This proposal was discussed with the regional CTT district of this paper's author from April 2023 (personal communication). It was then submitted for AGM approval in November 2023 (personal communication), and was voted on and then approved in December 2023 (personal communication). The new racing class option therefore was formally implemented by the CTT in January 2024. Since its introduction, the new racing class has been impactful on participation levels. The CTT stated in their annual report (CTT, 2025) that road bike rides had increased 72% in 2025 in absolute numbers despite total rides in the sport falling 23%. Conversely, TT bike rides had fallen 43%. This implies that a large number of competitors had either moved from one racing class to another or were leaving the sport altogether.

Whilst the use of road bikes in time trials has already been stated to occur before, the formalised regulations of the new racing class underpinned by relevant peer-reviewed literature. The rationale of "encouraging new participants who may not have access to a specific time trial bicycle" was based upon the concept of restrictive technological access acting as a source of controversy (Dyer, 2015). If access to a technology is restricted or provides additional obstacles, this can have a negative effect on sports participation levels (Brown, 2020). Regulatory design intended to broaden access also has a mixed evidence base. In athletics, World Athletics' 2008 decentralisation strategy was intended to lower barriers to hosting and competing in events. This succeeded in stimulating some new participation but had limited and unevenly distributed effects, with smaller and lower-income countries responding lesser than anticipated (Konjer et al., 2022). This finding is instructive for a governing body because it suggests that regulatory interventions aimed at accessibility can shift

participation patterns, but that their effects are neither automatic nor uniform across the population they target.

Therefore, it was assumed that if technological barriers are reduced, the subsequent participation levels could potentially increase. This reflects a broader structural tension within sport, whereby technological advancement can enhance performance while simultaneously reducing accessibility. Such a dynamic could be conceptualised as a technology-access paradox (Dyer, 2015). A road bike is a less specialised machine than a time trial bicycle, so it was assumed to be more widespread in its use or availability. The aspiration for this was then to attract new or novice riders who would more likely own a road bike as well as those who already participated in other forms of cycle-sport when using such a machine.

Any tendency for incremental equipment innovation in technologically oriented sports like time trialling can escalate the aforementioned "arms race". A recent narrative synthesis spanning mechanical, digital, and regulatory dimensions concluded that such escalation is best understood not as a series of isolated equipment controversies but as a systemic governance challenge, in which regulatory capacity routinely lags behind the pace of technological innovation (Alexe et al., 2026). This synthesis further argues that governing bodies are better served by proactive, evidence-based technology assessment frameworks than by reactive, piecemeal equipment bans (Alexe et al., 2026).

It has also been noted that the use of technology in sport can be negatively affected by effects of *coercion* (Dyer, 2015). This is where participants feel compelled to adopt increasingly advanced equipment in order to remain competitive, regardless of personal preference (Loland, 2009). It was felt that in the current use of time trial bicycles, this could see participants expend resources such as money or time that they did not wish to due to a need to remain competitive. Because the visual

appearance of the best and less advanced road bikes is then regulated through use of similar designs in wheels and handlebars, the effect of coercion was then hoped to be reduced. Doing so then reduces any burden of additional costs on the competitor.

Finally, these participation and technology pressures are best understood through the lens of sport governance as a strategic, rule-making function. Recent theoretical works on the legal and regulatory foundations of sport governance emphasise that governing bodies act not merely as administrators but as active shapers of a sport's structure, competitive balance, and accessibility through the rules they set (Cho et al., 2024). In the case of the RBC's introduction, it was hoped that the original road bike class concept and rules were felt to be both logical and intended to address some of the negative effects highlighted by Dyer (2015). However, it is not known after two full racing seasons how its end users actually perceived it. From a sports governance point of view, any regulations can be modified, updated or removed at the CTT's Annual General Meeting, so if there are areas that could improve the RBC concept further, it would seemingly make sense to have an understanding of how it was perceived once in service before further changes were made. Therefore, this paper will empirically evaluate the participants' perceptions of the RBCs' intent and its rules after two race seasons since its implementation.

Methods

Data collection protocol

To assess the current perceptions of the CTT RBC, an online questionnaire approach was adopted. Online-based questionnaires have been investigated for their value (Evans & Mathur, 2018). They offer notable clear advantages over other formats due to their global

reach, speed, convenience (Evans & Mathur, 2018), and anonymity. This therefore suits the geographical spread of time triallists based within the UK.

The questionnaire was constructed and housed using the "Google Forms" application (Google, Mountain View, US) to collect the data. When the data collection period ended, the data was downloaded from Google Docs to Microsoft Excel (Microsoft, Washington, US) for subsequent analysis. It is conceded that online data collection poses shortcomings which could apply to this study. These include sample identity control and duplicate or fraudulent submissions. In the case of this study, some of these shortcomings were reduced by inviting participation through sports-specific forums and social media platforms. An invitation to participate was also created via the governing body's own Facebook page and associated social media platforms. Whilst it was not asked where each participant has seen the advertisement, a large increase in response occurred quickly when the governing body itself promoted the study. It is assumed that this increased the perceived legitimacy of the study. All of these steps made it more likely that the participants were of the appropriate background.

The data collection took place from 23 September to 1 November 2025. This specific period was intentionally chosen as it fell outside the main competitive racing season in the UK for most participants. It was assumed that if the study had taken place earlier during the competitive season, this may have resulted in more biased responses based upon how each individual was performing at that given point in time. This approach to athlete-centred survey timing has been advocated in studies before (Dyer & Richardson, 2026). The data collection period was terminated once the number of respondents' over a full week' duration had dropped to zero. Institutional ethics approval was obtained prior to this study commencing.

Questionnaire design

The questions that would be offered to respondents would be derived from five categories. These were:

- The demographic of respondents.
- The reasons for racing in the RBC.
- The perceived purpose of the RBC.
- Current perceptions of the RBC.
- Perceived future legislative changes of the RBC.

The online survey began by providing a general demographic profile of the study by asking participants to disclose their gender, age range, club/team status, and the length of time participating in the sport. This was then followed by 13 questions that were intended to investigate the participants' perceptions of the RBC. The length of the answers provided by participants was unrestricted. The question design followed the underlying principles of those advocated and outlined by Krosnick (2017). These questions are listed in Table 1.

Table 1. Online questions.

1	Have you competed in the Road Bike Class at any CTT event since January 2023?
2	If so, what are your reasons for racing in the CTT Road Bike Class?
3	If you do not compete in the CTT Road Bike Class, what are your reasons for doing so?
4	In your opinion, what is the primary purpose of the CTT Road Bike TT Racing Class?
5	In your opinion, what type of participant is the CTT Road Bike TT Class currently catering for?
6	In your opinion, what type of participant <i>should</i> the CTT Road Bike TT Class be catering for?
7	What is your current overall opinion of the CTT Road Bike TT Racing Class?
8	Can you elaborate on why your opinion in question 7 is the way that it is?
9	Below are the current rules for the CTT Road Bike TT class. Do you think these rules support your opinion of what the class should be ?
10	If 'no' or 'unsure', please explain why.
11	Are there any specific aspects of the current rules you would change? If so, which ones and why?
12	Are there any important elements you feel are missing from the current rules?
13	Is there anything about the CTT Road Bike TT Class in general that you would like to see changed?

Questions 1–3 intable seek the background of the respondent since the RBC came into formal existence. Questions 4–10 sought the respondents' current perceptions of the RBC. Questions 11–13 sought the respondents' opinions on what they might like to see changed in the future with the racing class.

The question design sought opinions, so a response to all questions was not mandated. All participants were informed that their participation and consent based upon when they hit "submit" and that they could withdraw from this study prior to this by not completing the questionnaire.

A respondent sample size target was established beforehand using the Cochran (1977) formula, implemented via an online calculator (<https://www.surveymonkey.com/learn/research-and-analysis/sample-size-calculator/>), with a confidence level of 95% and a margin of error of 5%. Due to the different types of events on offer and the confounding variable of a rider competing in more than one racing class throughout the year, the exact sample population cannot be reliably identified. Instead, the sample population was based upon two checks. The first was derived from the total annual number of CTT participation rides provided in their 2025 annual report: 30,753 of their "Open" events or 43,900 rides of their "Club" level events (CTT, 2025). This would require a resulting response rate of 380–381 participants. The second check was based upon the number of unique riders who took part in a road bike Open event during the 2025 race season. This was 2997 riders (personal communication). This would require a resulting response rate of 341 participants. The higher target of 381 was selected for this study.

Analysis

Questions which produced qualitative data responses were analysed utilising thematic analysis. The method of thematic analysis

utilised in this study undertook an experimental multi-phase approach that utilised both manual and artificial intelligence-driven methods. To avoid any claims of bias, a manual thematic analysis was conducted and completed in full first. The manual approach utilised the well-cited approach by seminal works such as Braun and Clarke (2006), involving data familiarisation, generation of initial codes, searching and reviewing themes, theme definition, and then the final report. Once this was completed, a secondary approach of thematic analysis was undertaken using the illustrated steps by Turobov et al. (2024). The Turobov et al. method offers an alternative approach using an artificial intelligence large language model (LLM) to perform thematic analysis. LLMs use advanced machine learning techniques to learn from data, understand context, complex patterns, and respond to user queries accordingly (Khalid & Witmer, 2026). However, given the caution, errors, or limitations advocated when using LLMs alone for such analysis (Christou, 2024), it was only used in this study to augment the traditional manual approach that had already taken place. This multiphase experimental approach is supported in that, despite some LLM responses being inconsistent, they could serve as an additional coder for verifying human analysis (Wang et al., 2025). Whilst they can enhance qualitative analysis, their full potential is only realised under skilled human guidance. This collaborative approach essentially reframes LLMs not as a debatable replacement for human-based analysis but intentionally as a secondary coder and validation tool.

Two separate forms of LLM were utilised in parallel for this study to provide further assurances in the LLMs' findings. One was Chat GPT (Version GPT-5.3) (LLM1) and a second was Grok (Version Grok 4) (LLM2). The input query for LLMs, known as a "prompt", can be subjective and a source of variation in an LLMs' output. As a result, this study followed the

process established by Khalid and Witmer (2026) by considering:

- Task directive: The implicit or explicit instructions or questions to which the researcher wants the model to respond.
- Exemplars: Illustrative patterns or logic that the researcher wants the model to follow when it responds to the task directive.
- Framing: Background information provided to the model to help it better understand the task context.
- Response instructions: Guidelines specifying the desired constituents, structure, formatting, and style of the model's response.

Due to the relative infancy of LLM use for thematic analysis in peer-reviewed literature, no exemplars were used. The prompt for this study was designed by this paper's author and was entered identically into both LLMs on the same day and within two minutes of each other. This prompt was:

Your role is to be an academic expert in Qualitative Thematic Analysis. Please identify the themes contained in a column of spreadsheet data captured from an online survey. The original question was contained in box [X]. The resulting data is contained in column [X]. Generate a very broad range of initial codes and provide a name for each code using no more than four words. Please also suggest suitable overarching themes. It is hoped that the results from this survey will eventually be published in an academic peer-reviewed journal so please note that the prospective audience of this information be well-informed in both the sports field and the process of thematic analysis.

No further communication or exchanges were made with the LLM's during this part of the analysis. There may have been advantages to doing so but it was intended to minimise any risk surrounding ethical issues such as those outlined by Khalid and Witmer (2026) and because the LLM phase was deemed to be a secondary process.

There are valid claims that this study could possess some level of confirmation bias given that this paper's author conceived the RBC, drafted its legislation, helped shepherd it through the governing body's approval process, and then conducted the survey that subsequently evaluated it. This represents a potential conflict of interest. However, it is felt that this is a potential bias that has been actively managed, stated within this paper and the occurrence of a practitioner–researcher dual role is not unusual in fields such as health-care (Hay-Smith et al., 2016) or sport (Champ et al., 2020; Jones et al., 2007). It has been suggested that it is key to establish ground rules and planning, the importance of involving a critical friend or outside agent, the potential for role conflict, and the threat to objectivity (Jones et al., 2007). In this study, the data collection methods were defined ahead of the study being conducted, the various committees and democratic process provided multiple outside agents and the threat to objectivity was arguably addressed with the use of multiple LLMs acting as secondary coders for this study. Use of these was also intended to partially address issues surrounding interpretative bias by revealing any issues that may have been unintentionally suppressed or missed. The author of this paper acknowledges that complete

neutrality is not possible in this context; however, transparency in positionality and the use of systematic analytical procedures are intended to support the trustworthiness of the findings.

Results

Demographic results

801 participant responses were collected. No duplicate or incomplete responses were detected. 799 answered with respect to their gender. 84.6% of the respondents were male (676), 14.8% of the respondents were female (118) and 0.6% (5) preferred not to say. With respect to age bands, all 801 respondents replied and the distribution of these responses is shown in Figure 2.

Figure 2 shows the results demonstrating a relatively normal distribution but with the centre based around older athletes aged 51–60 years. Furthermore, of these responses, 88% stated they had *competed* in the RBC at any CTT event since January 2023, and 12% said they had not.

The total level of response for each question is summarised in Table 2.

There was a reduction in response percentage for any questions that sought further elaboration from the respondent to the previous question.

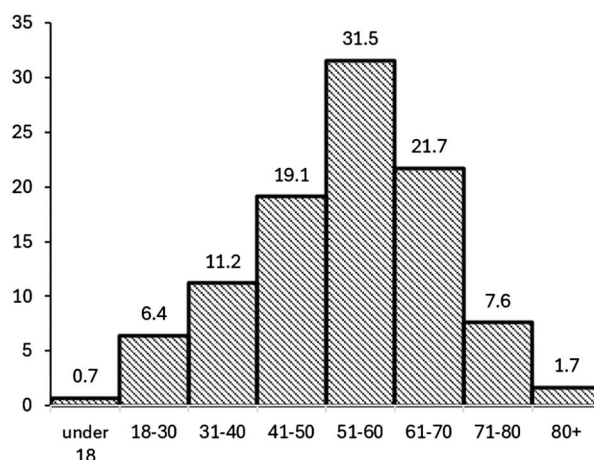


Figure 2. Questionnaire age demographic.

Table 2. Question response.

	Question	Responses (%)
1	Have you competed in the Road Bike Class at any CTT event since January 2023?	100
2	If so, what are your reasons for racing in the CTT Road Bike Class?	88
3	If you do not compete in the CTT Road Bike Class, what are your reasons for doing so?	27
4	In your opinion, what is the primary purpose of the CTT Road Bike TT Racing Class?	100
5	In your opinion, what type of participant is the CTT Road Bike TT Class currently catering for?	99
6	In your opinion, what type of participant <i>should</i> the CTT Road Bike TT Class be catering for?	97
7	What is your current overall opinion of the CTT Road Bike TT Racing Class?	100
8	Can you elaborate on why your opinion in question 7 is the way that it is?	96
9	Below are the current rules for the CTT Road Bike TT class. Do you think these rules support your opinion of what the class should be?	100
10	If “no” or “unsure”, please explain why.	29
11	Are there any specific aspects of the current rules you would change? If so, which ones and why?	76
12	Are there any important elements you feel are missing from the current rules?	73
13	Is there anything about the CTT Road Bike TT Class in general that you would like to see changed?	68

Thematic analysis

The results of the thematic analysis are summarised in Table 3.

The use of LLMs was stated to reduce any interpretative bias by revealing any issues that the author may have unintentionally suppressed or missed. The thematic analysis results did not seemingly indicate any such issues.

The major themes of the thematic analysis and their outcomes have been summarised in Figure 3.

Discussion

Use of LLMs for thematic analysis

The LLM-assisted analysis did not materially alter the themes identified through manual coding

but provided reassurance that no major themes were overlooked. As such, it functioned primarily as a confirmatory tool rather than a source of additional insight. However, there are risks associated with LLM use for thematic analysis that its assessment can be descriptive rather than interpretative (Turobov et al., 2024; Vikan et al., 2026). However, it was felt that this risk was minimised because the decision had been made for this study for LLM use to follow the traditional human-centred coding process. Furthermore, it was also felt that this risk was minimised given that the typical volume of qualitative data for each question provided by each respondent in this study was typically never greater than two sentences.

The number of respondents' well exceeded that of the target meaning that their views

Table 3. Thematic analysis results.

Theme	Sub-theme
Reasons for racing in the road bike class.	Lower cost & reduced resources A unique racing experience A rejection of techno-centricity
Perceived purpose of the road bike class.	Increased inclusivity Increased inclusivity Technological suppression
Barriers to participation in the road bike class	Reduction of participant costs Lack of class equality Lack of perceived value
Current perceptions of the road bike class	Pre-established satisfaction with TT class A high level of satisfaction with the current rules Equipment dissatisfaction
Future legislative changes	Rule application concerns Support for current ruleset Missing elements of technological regulation Structural Equality with enhanced recognition and promotion

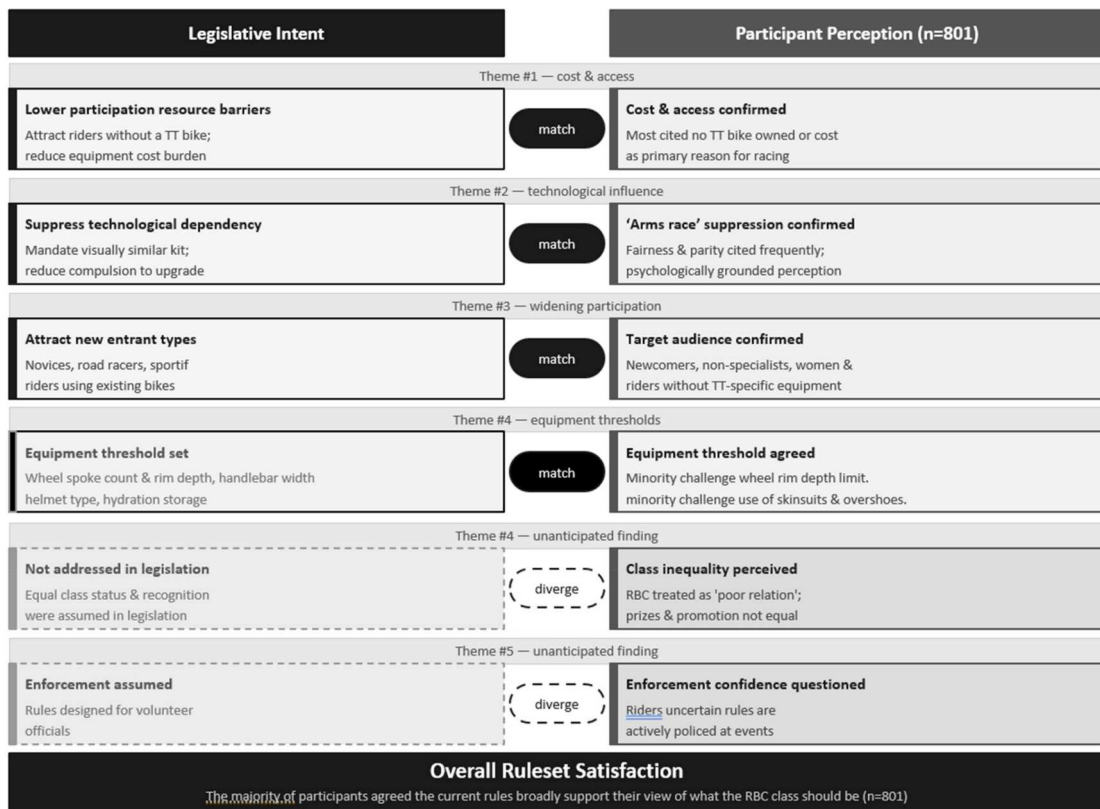


Figure 3. Theme summary diagram.

should be considered broadly indicative of the current participants in the sport of time trialing. Whilst there are always concerns that online survey-based fraud could take place, there was no evidence of this detected in the result. It is also noted that the majority of respondents were males and within a specific age band. It is not clear if this matches the actual current core demographic of the sport as a whole, but this study may need to be repeated in the future if the governing feels that this demographic has changed.

Reasons for racing in the RBC

The RBC was inherently seen as a more inclusive group and offered a seemingly less elitist atmosphere when compared to other race classes of the sport. Respondents' in this study

confirmed this with comments like: "Not everyone can afford a specific time trial bike and allowing a road bike section is more inclusive" (Respondent #750), "A RBC category makes events feel more inclusive to all riders not just riders who own a tt bike" (Respondent #758) or "My experience is it's really inclusive of everyone – regardless of ability" (Respondent #77).

The types of riders that they felt the RBC was aimed at were agreed as newcomers, novices, non-specialists, or those who fundamentally do not own a specialised time trial-specific bicycle. This was supported with views that the class was aimed at "Everyone with a road bike, but more at newcomers than those pushing the boundaries at the fast end of the field" (Participant #136) or "Newcomers and local riders who don't have a TT bike but fancy doing an event" (Participant #495). An

additional theme linked to this was also that the RBC's suppression of technology could then encourage and increase specific types of participants that had traditionally not specifically been identified, targeted, or supported. These included women, those lacking in confidence, those intimidated by technology, or those seeking new prize-winning opportunities. This was evidenced when Participant #235 remarked that the RBC should be "as diverse as possible; opening up TTs for more women or people who may be less confident or expert" or that it is intended for "every category of rider, but especially the young and women, who are still very underrepresented" (Participant #415). This feedback aligns with the original concept of the class outlined in this paper and there were no negative comments identified in the data that countermanded this concept.

Respondents' commented that the RBC was deemed fairer and more attractive due to its perceived avoidance, reduction, or rejection of technological dependency. The perceived fairness of sports technology is inherently relative and context specific (Dyer, 2015) yet was cited frequently as a phrase in responses, nonetheless. This included comments like "to make it more affordable and have a relatively fair class where the bikes are vaguely similar" (Participant #224) and "fairer (in theory) as a more level playing field" (Participant #231). This observation is contrary to the physics involved in cycling motion because a difference between classes in their typical cruising velocity, the road bike still moves fast enough to see aerodynamic drag being its most predominant resistant force (Fintelman et al., 2014). This therefore suggests that this reduction or rejection of technology is ultimately grounded as a psychological perception. Therefore, it would be recommended that any future changes to RBC legislation remain sensitive to the perceived optics of what can be observed by competitors and not exclusively derived from the physics that govern a bicycles performance.

Perceived purpose of the RBC

There were indications provided that the RBC was offering a different event experience to the alternative TT class. Some of this was the specific design of road bikes providing a more "pleasurable" riding experience in general, one that was safer or one that minimised the impact of a riders' current injuries or physical limitations. Participant #438 remarked that they were enjoying the RBC "also for the fun challenge using an existing road bike" or "and it's far more enjoyable and fun" (Participant #2). With respect to safety, it was commented that they "feel safer" (Respondent #22) when participating in the RBC or their reasons for participating in the class were for "comfort and safety – don't like technical courses and rough roads on my TT machine" (Participant #130). An aerobar-based time trial bicycle does position a cyclist into an extreme riding position that prioritises the minimisation of aerodynamic drag (Fintelman et al., 2014). As a result, the use of aerobars does not guarantee comfort or pleasure, thus the RBC provides an alternative approach. Under this same theme, it was also mentioned by participants such as #307, #308, #328, and #720 as they "prefer hilly courses" and that the RBC provided the best technological solution to that end. Whilst it is not clear here whether it is the physical challenge or the geographical location that serves as the basis for this preference, studies in other sports like running have proposed that the type and location of running can affect or improve both mood and mental health (Oswald et al., 2020) and in golf and football show how environmental contexts can deepen a participants' positive experiences (Jang, 2022).

Barriers to participation

The respondents' reasons for racing in the RBC were frequently cited as being cost, access, or resource influenced. The economic barriers or

the fact that a time trial-specific bicycle was not owned was mentioned in approximately over half of the responses received. Regarding the lack of access or ownership, Respondent #167 stated that “[I] Don’t own a TT rig and don’t ride enough TT races to justify owning one” and Respondent #393, who said, “Don’t have a TT bike but enjoy competing”. With respect to cost specifically, Respondent #11 stated: “[I] Don’t own a TT bike and unsure if investment just for TT’s is worth it at this stage” or Respondent #141, who stated: “I can’t afford a horrendously expensive TT bike”. These views support the sensitivity of the cost of sports technology (James, 2010) and its potential effect on participation (Wicker et al., 2009). At this point, it would seem pertinent to ensure that any future changes in the RBC legislation do not lead to unforeseen or incurred increased costs on the part of the participant if no clear added value is identified. A possible exception to such concerns can be when all the ethical factors and impacts regarding a given sports technology are taken into overall balance (Dyer, 2020). It should also be noted that this sensitivity to cost and subsequent fairness was also the same rationale cited by Canada’s cycling governing body for restricting the time trial equipment used by younger riders from 2025 (Hansen, 2025). Whilst the limit of what level of cost can be tolerated is unclear and relative, it was made clear in this study that any perceived “arms race” is a topic of sensitivity that is either seen as negative or one that requires a constant investment of a riders’ resource. For example, the implied negative nature of an arms race was mentioned frequently by participants such as “Really enjoy getting back to the purity & not the arms race” (Respondent #466) or “I got fed up with the TT bike ‘arms race’” (Respondent #634).

Whilst the RBC’s nuances and merits were made clear by the respondents, there were some consistent themes of barriers that could prevent the RBC from achieving further levels of satisfaction or growth. These included a

perception that the RBC was not currently being treated as an equal racing class when compared to those already in place. Specific examples of this included both the classes’ promotion on social media and how prizes in events were being awarded when compared to the TT class. Examples of this included comments like: “However, most organisers do not recognise it as another category/separate race and it’s treated as a poor relation by CTT” or “If you read any post event write up it always focuses on TT bikes and gives men’s results first so there’s gender bias too” (Participant #732) and “sometimes it feels like CTT Road Bike racers are treated like ‘second class’ citizens” (Participant #430). This perceived disparity should be urgently addressed.

There were also concerns that this new class would merely replicate the historical criticisms of the TT class by seeing technologically-based “creep” as riders would again seek further and further performance enhancement with the aim of reducing aerodynamic drag via the expenditure of costs. Therefore, the class simply reconfigures the concept of technological optimisation. Whether such a slippery slope or creep effect can be restrained or halted is unclear. For others who specifically chose *not to compete* in the RBC, a small number of respondents cited their reasons centred around a strong preference or commitment to the speed, characterisation, and merits of the existing and inherently faster time trial class with little reason to change as a result. This suggests a positive leaning towards the unique merits of the time trial class or a negative one whereby it is seen that the RBC offers a lack of added or diverse value.

Future legislative changes

When the participants were presented with the current ruleset of the RBC and asked if these rules supported their opinion of what the class should be, nearly three-quarters of respondents agreed. Whilst we can conclude

that the participants therefore overwhelmingly agree that the rules in their current form broadly support what they feel the class should be, the subsequent data revealed consistent reasons why those who said “no” (14%) felt that particular way. The main reason for dissatisfaction with the rules was seen to be that the prescribed current maximum wheel rim depth limit of 90 mm was felt to be excessive and respondents in question 13 also supported this view further by stating specifically that they would prefer a reduction in the current wheel rim depth limits with comments such as: “90 mm is too deep, no one rides a standard bike with rims that deep, should be 60 mm max” (Participant #328) or “90 mm wheel depth is a lot” (Participant #370). This specific issue was deemed significant enough to lead to a proposed rule change at the CTT AGM held in January 2026 (CTT, 2025) to reduce this to 65 mm. However, this proposed rule change at the CTT AGM did not gain the required level of a two-thirds majority from its voting delegation. Therefore, that outcome mirrored this study, i.e. that the majority of participants are broadly happy with the current rules but for those that are not, it is the wheel rim depth limit where their dissatisfaction lies.

There were also concerns by respondents with the CTT’s ability to police their rules regarding the contact points and grip of the hands of the rider or in fact whether the sport is actively policing their rules at all. The RBC rules regarding which points of the rider can contact the bicycle are nearly identical to those of an international cycling governing body, so the current rules requirements are not necessarily at fault but it is proposed that the policing of its rules are made more visible and more obvious to its participants to reassure this lack of confidence.

In terms of what respondents felt was missing from the current RBC regulations, the vast majority stated a “no/no change/satisfied” position and that they were satisfied with the

current ruleset. In the question that sought elaboration, the majority of respondents chose not to add comment. However, when comments were supplied, most regarded dissatisfaction with three issues. The first was the aforementioned wheel rim depth maximum limit rule. The second point was the aforementioned riding position contact point regulations, and finally it was felt that further clarification was required on the measurement and policing of the rules. Additionally, there were a small number of objections to the use of clothing that was more typically historically associated with the TT class such as skinsuits and overshoes. Participant #624 suggested such restrictions as a way to increase participation by “Possibly restricting the use of skinsuits as a way of bringing costs down further and enabling a rider to still feel they can be competitive with a smaller investment” or “I also believe that skinsuits, aero sleeves and aero socks do not fit within my preferred version of a road bike category” (Participant #642). The clothing concerns are interesting because imply that these riders wanted to see clothing of a non-specialised nature being the default apparel, even though such skinsuits and aerodynamic socks are currently legal within most forms of competitive cycling anyway.

It should be noted that the resulting themes for participants competing in the RBC are almost broadly identical to the reasons that respondents gave for their perceived purpose of the road bike class. Therefore, it could be perceived that the current class and its current standard and content of regulations are meeting the expectations of its participants. However, this could also be due to some degree of conscious or subconscious confirmation bias on the part of a respondent. However, it is hoped that any such bias was addressed later in the survey, whereby their opinions on the specific design of the current legislation or their needs for the future were requested.

Practical implications

From a theoretical perspective, the findings in this study suggest that equipment-based classification systems may serve as a potentially effective mechanism for mediating the relationship between technological development and participation. While classification systems have traditionally been used to ensure fairness in contexts such as disability sport (Tweedy & Vanlandewijck, 2011), their application within a single discipline to address technological inequality represents a comparatively underexplored strategy within sport management literature. The findings of this study therefore contribute to an emerging understanding of how regulatory design can be used to balance performance, accessibility, and participation within technologically evolving sports.

Governing bodies should avoid rule changes that increase participant costs or accelerate technological arms races, as these were consistently identified as barriers. They should also actively promote the new racing class as equivalent in status through equal social media coverage, prize structures, and event branding to counter perceptions of it being a “second-class” category. Finally, they should enhance visible rule enforcement to maintain trust. These steps follow directly from participant feedback and could support long-term participation growth by preserving the class’s intended ethos of accessibility and fairness.

Conclusion

This study examined participant perceptions of the Cycling Time Trials (CTT) Road Bike Class following its introduction as a governance intervention intended to address declining participation in UK-based cycle time-trialling. Drawing on a survey of the sports participants, the findings indicate that the new racing class is broadly perceived as a positive and meaningful addition to the sport. In particular, respondents consistently associated the class with reduced

financial burden, increased accessibility to the sport and a reduction in perceptions of being a technologically driven competition.

These findings support the proposition that equipment regulation can function as a mechanism through which governing bodies actively shape participation conditions. From a sport management perspective, this study suggests that the introduction of alternative competition structures may represent a viable strategy for addressing participation challenges in technologically orientated sports. While early perceptions of the new racing class are largely positive, the continued success of the class will depend on its ability to maintain its intended ethos.

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Author contributions

CRedit: **Bryce T. J. Dyer:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing.

Disclosure statement

The author was the originator of the CTT Road Bike Class proposal and subsequently drafted the initial regulatory wording that was approved at their Annual General Meeting. The author was also serving on a CTT district committee and chaired the CTT’s Rules Advisory Group ‘Equipment & Clothing’ sub-group at the time of the proposal. To mitigate potential bias arising from the author’s advocacy for the innovation, several safeguards were implemented. First, the survey instrument was designed and distributed anonymously via independent channels (including the CTT’s own social media), with no identifying

information collected beyond standard demographics. Second, thematic analysis followed a two-stage process: a traditional manual coding approach was completed in full before any LLM-assisted validation was undertaken. Third, an a-priori sample size was calculated, and data collection continued until responses plateaued, independent of the author's expectations. Finally, once the human-led analysis, discussion, and conclusions were drafted, two independent large language models were prompted to provide objective summaries based solely on the raw survey data; these outputs were used only for validation and are reported transparently in the Methods section.

The views expressed in this paper are those of the author alone and do not represent any official position of Cycling Time Trials (CTT).

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