

Different Spokes: A Multidimensional Scale Analysis of Market Segmentation in Mountain Biking

Key Words

Mountain biking, extreme sports, fragmentation, market segmentation, multidimensional scale analysis, social construction of technology

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Abstract

Utilising a multidimensional scale analysis and a product content analysis this study sought to investigate and model the mountain bike market. A pairwise questionnaire was devised and distributed through two online forums gaining 101 responses from regular mountain bikers. This was supported by a content analysis of 218 bikes offered to the market by eight manufacturers, in order to evaluate the nature of the mountain biking consumer landscape. The findings indicate the existence of six segments within the mountain biking market (cross country, trail, all mountain, enduro downhill, gravity and freestyle). The study also found evidence to suggest that the market is hierarchical in nature. It was concluded that mountain biking becomes increasingly specialised and fragmented from the median point of the hierarchy, where all six market segments become apparent.

Introduction

In sporting terms mountain biking is a relatively recent development. In Marin County, California in the late 1970s a group of young road riders took to the hills on modified beach cruisers, which they referred to as Klunkers and thus the sport of mountain biking began (Rosen, 1993; Ruff and Mellors, 1993; Berto, 1999; Eassom, 2003; Palmer, 2006; Savre et al., 2010). Following the development of the first production mountain bike, designed by Joe Breeze (Rosen, 1993), the sales of this new style of bicycle took off exponentially. In 1983, United States (US) sales of mountain bikes had reached 200,000 (Foote, 1987; Coello, 1989). Seven years later that number had reached 15 million (Keller, 1990). As a result, by the end of the

1980's mountain bikes were no longer viewed as an oddity and had gained genuine mass-market appeal (Ruff and Mellors, 1993). Mountain biking's popularity has continued, to the extent that they accounted for a quarter of the 18.7 million adult bikes sold in the US in 2012 (National Bike Dealers Association, 2014).

Mountain biking has been described as both a product of its age (Eassom, 2003) and postmodernity (Rosen, 1993). Rosen (1993) suggests this via the use of Pinch and Bijker's (1984) theory of technological social constructivism, which has been demonstrated to be a plausible driver of technological developments in society (Klein and Kleinman, 2002; Humphrey, 2006). This presents a foundation from which to engage in an observation of the mountain biking market and in particular the bikes as products, which themselves are socially constructed pieces of technology (Rosen, 1993).

Mountain biking is a highly technologized activity and its development has been facilitated through innovation in two contexts. Firstly, the development of increasingly high-tech products, such as advanced shock absorbance systems (Baltes et al., 2008; Redfield, 2010), have opened up new terrain and styles of riding to participants. Secondly, mountain bikers have been shown to be keen innovators of technology, which they adapt in order to aid their riding (Lüthje et al., 2005). This draws the discourse towards an increasingly functionalist perspective with regards to the technology, where the evolution of the sport has been governed by innovations in equipment, coupled to the way in which participants use technology in order to develop new forms of riding. It is the usability of products, in this case technology, that provides success within the market place (Mahner and Bunge, 2001), a point reinforced by What Mountain Bike (2016a) who stated that consumer demand creates

the market within the sport. Ever advancing technology has also created a notable churn within the market and it is the progressive nature of the equipment that has arguably allowed mountain biking to develop in the way in which it has. Rosen (1993, p.485) suggested that “mountain bike design is constantly changing” but it could be equally argued that mountain biking, as a sport, is itself ever changing also. Thus linking its evolution to the advancements in technology.

The rationalism and intense specialisation at the heart of the evolution of mountain biking is evident, although surprisingly under evaluated in literature. In competitive terms, Savre et al. (2010) detail the early sportification of mountain biking through the development of racing events. This began with the first Repack Race in 1976 (Breeze, n.d.), which took the form of a “downhill time trial” (Berto, 1999, p. 41). By the time of the first world championships at Durango in 1990, competitive mountain biking had become two differentiated specialisms; downhill and cross country (Savre et al., 2010), the latter eventually being included in the programme in the 1996 Atlanta Olympic Games (Savre et al., 2009). However, information gained from 22 leading mountain biking manufactures in 2008 and 2015ⁱ (see figure 1) demonstrates the plurality of the sports evolution, beyond those two initial styles of racing into a much larger number of differing formatsⁱⁱ. This has been attributed to the riders themselves and particularly the way in which they innovated their practices to develop new forms of riding (Mountain Bike Magazine, 1996), arguably only made possible via advancements in technology.

A cursory examination of these differing forms of mountain biking would undoubtedly highlight variances between both practices and products, denoting the emergence of differing markets. However, these would be purely observational in

nature and at best anecdotal. Indeed, up to this point little analysis has been conducted on the fragmented markets in mountain biking. Parks Canada (2010) listed cross country (both traditional and marathon), downhill, freeriding and dirt jumping as the four main formats in a report on mountain bike market profiles. However, this basic appraisal of a complex and interrelated web of similarities and differences, between various industry-defined styles of mountain biking, emphasises the need to analyse and categorise the market further.

Despite referring to this process as a fragmented evolution, an argument could be made that this is in fact market segmentation. In its basic format this can be encapsulated as the “concept of dividing, a large, diverse group with multiple attributes into smaller groups with distinctive characteristics” (Schwarz and Hunter, 2008, p.6). Previous research on extreme sports has focused on participant characteristics, predominantly the biographical makeup of consumers within the market segments (Bennett et al., 2003; Bennett and Lachowetz, 2004; Ko et al., 2008; Hennings and Hallman, 2015). However, this study sought to take a different approach by focusing on defining the market using the products themselves in tandem with an analysis of the views of mountain bike participants regarding the similarities and differences between varying formats of the sport, in order to create a model of the overall market. Additionally, previous studies have focused on individual extreme sports as niche markets, without taking into account the intricate and often fragmented arrangement of sub-styles, which make up these ‘whole’ sports. Therefore by taking this approach this study sets out to explore mountain biking as a specialised heterogeneous environment rather than a single homogenous market.

Postmodern society is increasingly liquid in nature (Bauman, 2005) and the plurality of opportunity presented to individuals allows for greater autonomy of choice when selecting identity. Choosing a 'type' of sport to take part in becomes symbolic of such choices and suggests more than it just being a pursuit that an individual enjoys. It says something about whom they are and how they wish to be viewed by the world. This is particularly the case in lifestyle sports, as they possess a strong subcultural dynamic (Wheaton, 2004). Activities such as mountain biking offer participants "a high level of stability and distinctiveness in the culture's sense of collective identity and forms of status" (Wheaton, 2007, p. 300). Mountain biking simply extends the concept of cultural stability and it must be understood that participants do not simply choose to ride mountain bikes, they also select what 'type' of mountain biker they are (or at least the type they would like to be perceived as being). This being the case, there is an inherently unanswered question: If the styles of mountain biking differ from one another, then how so? This study does not wish to engage in responding to the wider more cultural points raised here. But defining the market will be the first stage in understanding the various styles of mountain biking. It will lay the groundwork needed to address this area further and allow a greater perception of the cultural identity within each of the markets.

Thus the central aim of this study was to evaluate mountain biking riding styles in order to assess their relative similarities and differences and build a more complete picture of the market segmentation that has occurred within the sport. It is the intention of this study to create a model of the mountain bike market based on the available evidence and to further develop an understanding of the individual characteristics of the various formats of the sport.

In order to achieve this three research objectives were set to define both the categories of mountain biking, as well as the products and segments within the market place. These were:

- 1) To define the relative similarities and differences between alternative formats of mountain biking.
- 2) To analyse the differences between products in order to establish categories within the mountain biking market.
- 3) To establish a hierarchical model of products and formats within the sport of mountain biking.

Method

This study used a two-stage approach in order to address the research objectives. In phase 1 a multidimensional scale (MDS) analysis was conducted using data gathered from regular and committed mountain bikers. This was interpreted initially using basic information and definitions gained from the Union Cycliste Internationale (UCI) and the mountain bike press. Phase 2 centered on the analysis of 218 mountain bikes sold by eight leading manufacturers. The analysis of this data was two fold. Firstly, the products themselves were evaluated to establish differences in design and this facilitated a reappraisal of the initial MDS analysis and the establishment of different market segments. Additionally, individual market segments were explored using an analysis of the quality of bike component equipment. Using this approach it was possible to create a model, which not only defined the differing segments within the mountain biking market, but also facilitated a greater understanding of the levels of product quality and resultant pricing within each format of the sport.

Phase 1: Multidimensional Scale Analysis

Participants

101 regular mountain bike participants (90.1% males; 9.9% females) aged over 18 ($M=34.6$ years) responded to an online questionnaire. All rode at least once a week (32% once a week; 68% more than once a week) and had participated in the sport for at least three years (44.6% three to nine years; 29.7% ten to nineteen years; 25.7% twenty years plus). The respondents represented a broad sample of participants from the various styles of mountain biking.

Participants were recruited via two internationally popular mountain bike forum websites (www.pinkbike.com and www.mtbr.com), where a link to an online questionnaire was posted. Subject information related to the study was provided at the top of the questionnaire itself and respondents were informed that completion of the questionnaire represented consent to participate in the study. Ethical approval was confirmed through the lead author's institutional ethics committee prior to commencing the data collection process.

Procedures

MDS analysis allows the “simultaneous measurement of several attitudes associated with a set of dichotomous items” (Coleman, 1957, p.253) and therefore this study used a pairwise approach to create comparisons between formats of mountain biking. Using this approach, participants were required to respond to questions where

differing styles of mountain biking ($k=13$) were individually compared against each other (e.g. cross country and downhill, downhill and trail riding) using a Likert scale (1932) scoring system (zero = complete dissimilarity to ten = complete similarity). The thirteen riding styles were constituted by the twelve shown in figure 1 from twenty-two leading manufacturers (dirt jumping, street riding and slopestyle were considered separately for this analysis) with the addition of trials riding, due to the fact that it also regularly appears in the mountain bike media. As a result it was necessary for respondents to make seventy-eight separate comparisons.

Data collection took place over a six-day period with the aim of achieving 100 responses from participants who met the study criteria. Previous examples of MDS research made use of samples ranging from under 25 through 100 (see Yoshida, 1968a; 1968b; Clarke et al., 1986; Moore, 1990; Blank and Mattes, 1990; Hollins et al., 1993) and therefore gaining 101 responses provided a stable base for analysis.

Data Analysis and Interpretation

The data was analysed using the Proxscal algorithm (Kruskal and Wish, 1978) as has been used in numerous recent publications in academic fields ranging from pharmaceutical research (Cleophas and Zwinderman, 2015) through to examinations of social media usage (Radulescu and Turcitu, 2013). An initial examination was conducted using a Principal Component Analysis (PCA), which made it possible to produce a scree chart. This was then followed by the creation of a two-dimensional common space diagram, again using the Proxscal algorithm (Kruskal and Wish, 1978).

MDS analysis carries with it the benefit of allowing proximal similarities and differences to be effectively mapped and visualised using a common space diagram (Mugavin, 2008). It does this by converting numeric information into a graphical format and the resultant proximal distances indicate the relative closeness of varying groups. Effectively the closer that two groups appear on the common space diagram the closer respondents believe their nature to be. In essence MDS analysis represents a valid alternative to other statistical methods such as factor analysis (Johnston, 1995) and provides a useful statistical tool within inductive research of this type.

Although MDS analysis provides evidence of intergroup similarities, what it does not prove is the existence of intergroup relationships. In its basic form, MDS analysis allows a researcher to observe the relative combined judgements of test subjects, who are asked to judge “psychological distances” (Kruskal and Wish, 1978). In this case, respondents were asked to state whether each style of mountain biking was either similar or dissimilar from one another. Borg and Groenen (2005, p.4) explain the use of MDS analysis in this kind of exploratory format by stating that it allows the researcher to observe the structuralisation of data, placing it in a rationalised format. In this context, MDS analysis provides a solid platform for inductive analysis from which to investigate links between groups.

Inline with the approach presented by Borg and Groenen (2005), this study interpreted the proximities present on the common space diagram using descriptions of mountain bike styles provided by the UCI and also the mountain biking press. This then served to create initial categories for further refinement using the data gathered in the second phase of this study.

Results

The PCA indicated a tri-dimensional nature to the differences between styles of mountain biking (see figure 2). However, it must be noted that the third dimension is approaching a poor level of fitness according to Kruskal's guidelines (1964). Therefore to ensure data integrity, a common space diagram (figure 3) was produced using two dimensions of difference.

Using information from the mountain biking press it was possible to separate styles into formats that involved tricks and stunts (freestyle) from those that did not. Secondly, it was possible to separate the remaining styles of mountain biking into those that solely involved riding or racing downhill (gravity) from those that include riding both up and downhill (trail). Finally, using the UCI recognised competitive formats of mountain biking it was possible to further separate out the forms of mountain biking into five initial market segments: freestyle; competitive gravity; non-competitive gravity; competitive trail and non-competitive trail (see figure 4).

Phase 2: Defining the Markets Through Product Analysis

Materials

The websites of eight mountain biking manufacturers were used to conduct a content analysis of the products within each of the mountain bike market segments. Information on every bicycle labelled as a mountain bikes, that made up the ranges of eight international mountain bike brands (Specialized, Commencal, Cannondale, Kona, Saracen, NS Bikes, Transition Bikes and Dartmoor Cycles) were included

within the sample. The choice of these manufacturers was deliberate in order to represent a broad sample of international bicycle companies (both European and American) of varying size.

Procedures

Information was gathered on all complete bicycles available in the 2016 ranges of each of the sampled manufacturers and the details of all models were collated into a spreadsheet for analysis. Only male mountain bikes were used as across the ranges of the sampled manufacturers, only twenty-eight mountain bikes were female specific models, as opposed to the more expansive range that make up the male mountain bike market and constituted the sample within this study ($N=218$). The decision to exclude female models of mountain bikes was made as the analysis centred on the geometry of the bicycles themselves and, being designed for women, it was felt that this could impact on the results due to differences in design based on gender. So to avoid skewing the results, only male mountain bikes were included within the sample.

Models of mountain bikes in each of the ranges were classified under one of the thirteen styles of mountain biking previously identified using the descriptions provided by the manufacturers. The analysis of the information gathered on each product then took a dual focus. Firstly the geometry of the mountain bikes was explored and this centred on three key characteristics: the level of travel of the front suspension, the size of the wheelbase of the bike (wheel to wheel distance) and the head angle of the bikes (angle of the front forks). Rear wheel suspension was not explored as many models of mountain bike were hardtails (no rear suspension) and therefore this would not allow for a like for like comparison.

Secondly, the qualities and characteristics of the products themselves were evaluated by assessing the types of components that constituted each of the mountain bikes included within the sample. Key to this was the exploration of materials used and the technology attached to products in order to develop a coherent impression of the hierarchical structure of the mountain biking market.

Data Analysis

Data gathered from the content analysis of mountain bikes was evaluated in two distinct ways. Firstly, the geometrical data was analysed using statistical methods. The data in all three variables (front suspension, head angle and wheelbase) was found to be distributed non-normally and therefore required nonparametric methods. To test multiple groups a Kruskal-Wallis H test (Kruskal and Wallis, 1952) was conducted but as there is no follow up *post-hoc* test, a series of Mann-Whitney U tests (Mann and Whitney, 1947) were conducted in order to establish intergroup difference, as suggested by Ntoumanis (2001). As this involved multiple testing of six different groups of mountain bike products (therefore presenting five different statistical comparisons) a Bonferroni correction was applied to the significance level used within this study ($p=.01$).

The second analysis of the mountain bikes within the sample involved the materials and components that made up the products. Information was gathered on the materials used to produce the frames (e.g. carbon, aluminium alloy or chromalloy) as well as the quality of the parts that made up the bike and this data was evaluated in terms of quality using similar approaches used by other content analysis researchers

(e.g. Duckworth, Halpern, Schutt and Gillespie, 2003). These factors were evaluated to create a hierarchical dimension to the market segmentation within mountain biking.

This analysis also prompted the re-evaluation of the geometry data for trail, all mountain and enduro downhill bikes at the point within the market identified as the participant level. This was again carried out using a Kruskal Wallis H test (Kruskal and Wallis, 1952) and a follow up Mann-Whitney U test (Mann and Whitney, 1947). These additional tests were again conducted under a Bonferroni correction ($p=.025$).

Finally, the hierarchy model was gauged against the price of the products in each form of mountain biking to establish if differences existed between models within each market segment. The analysis of price was conducted in UK Pounds across all ranges to ensure consistency of comparability.

Results

It was notable within the sample of 218 bikes that several forms of mountain biking were not represented (trials riding, northshore, marathon and four cross racing). Their complete absence from the ranges of eight large manufacturers highlights these forms of mountain biking as being more niche markets than those represented within the sample. Also it was noted that products in the gravity market were referred to as being usable for both freeriding and downhill racing universally. A similar characteristic emerged within freestyle and therefore it was found that these were single markets in terms of consumer products. Therefore within the sample, six formats of mountain biking were represented, including cross country ($n=22$), trail

riding ($n=73$), all mountain ($n=54$), enduro downhill ($n=20$), gravity ($n=30$) and freestyle ($n=19$). Using the statistical analysis of the difference in front suspension, wheelbase and head angle among the various forms of bikes, it became possible to demonstrate differences within these market segments (see figure 5).

Freestyle was shown to differ from cross country in only one respect (wheelbase, $p<.001$, $r=-.67$). Trail bikes were shown to have a more relaxed geometry than cross country bikes, with a greater level of suspension ($p<.001$, $r=-.45$) and a slacker head angle ($p<.001$, $r=-.42$). Bikes labelled as all mountain differed strongly from trail bikes across all three characteristics (front suspension, $p<.001$, $r=-.63$; head angle, $p<.001$, $r=-.61$; wheelbase, $p<.001$, $r=-.45$). However, the difference between all mountain and enduro downhill only manifested itself in one characteristic, front suspension but this was accompanied by only a moderate effect size ($p=.004$, $r=-.33$). The difference between enduro downhill and downhill was demonstrated to be strong across all three variables (front suspension $p<.001$, $r=-.89$; head angle $p<.001$, $r=-.84$; wheelbase $p<.001$, $r=-.68$).

Analysis of the products themselves and particularly the components and manufacturing materials allowed for the development of four hierarchical levels (beginner, participant, enthusiast and elite). In the beginner market, products are basic, heavy and non-mountain bike specific. Within the participant market, products are designed for specific forms of mountain biking and therefore are presented to market with more advanced technology. Moving into the enthusiast market, products start to see the introduction of premium component brands (e.g. Fox Suspension) and the use of lightweight materials (e.g. carbon fibre). Within the elite market, products

are either comparable to, or exact replicas of, models used by professional mountain bikers.

Products within the participant market were found to be comprised of bikes whose components were specific to particular forms of mountain biking in cross country, gravity and freestyle. However, within the participant market for trail riding, all mountain and enduro downhill this was not the case and it was noted that the bikes themselves in these categories were similar to the degree that there was little difference between the products appearing under different labels. In response to this, a re-analysis of the geometry of products offered to consumers under these three styles of mountain biking (all mountain, trail riding and enduro downhill) within the participant market was conducted. Using a Kruskal-Wallis H test (Kruskal and Wallis, 1952), no difference was found in both front suspension ($p=.140$) and wheelbase ($p=.065$). Head angle ($p=.034$) was found to be the only variance between the three formats. Indeed, through further testing using a Mann-Whitney U test (Mann and Whitney, 1947) head angle was only found to significantly differ between all mountain and trail riding bikes ($p=.011$, $r=-.49$). Across all three styles of mountain biking, the use of the similar components, along with similar wheelbase and levels of suspension meant these were merged to form a unified market at the participant level and only separated at the enthusiast level (see figure 6). Therefore the results of this study indicate that mountain biking becomes increasingly specialised as product prices increase and that it is possible to highlight this in a hierarchical model of the market (see figure 7).

Discussion

The results of this study demonstrated the mountain bike market to be fragmented and specialised. The overall aim of this study was to develop a model of the mountain biking market in two distinct contexts. Firstly, the differing styles of the sport that make up segments within the market and secondly, how these can be viewed hierarchically in terms of product quality, specificity and price. The discussion presented here addresses these points and provides an examination of the model of the mountain bike market presented in figure 7.

Before discussing the findings of this study, a key fact to emerge from the data must be explored. This relates to the range of formats represented within the sample of products used within the second phase of this study. This differs from the twelve styles identified in figure 1 and concerns the notable absence of three formats (marathon, four cross and northshore). Trials riding was also initially included within the MDS analysis but was also absent from the sample of bikes collected in phase two. This fact could possibly indicate that these formats are either niche or declining markets. The findings of this study do not support a judgement on this but it does suggest that these formats are peripheral to the core mountain bike market. To be certain of this further investigation is needed, but this was outside of the remit of this project. The absence of these formats therefore left nine forms of mountain biking to be analysed in the second phase of this study and the discussion presented here focuses on these as core mountain biking styles.

The starting point for the initial analysis of the MDS data was to look at the activities themselves. Firstly, it was clear from the mountain biking media that formats of the

sport could be separated in two groups; styles that involved stunts and tricks (freestyle) and those that involved riding on trails (Kesteven, 2014). This second group of trail riding formats could also be separated into two subgroups; those that are categorised by riding solely downhill and those that involved riding both up and downhill (see Gray, n.d.; iBikeRide, n.d.; What Mountain Bike, 2013; Kesteven, 2014). For ease these were labelled as gravity and trail formats and along with the freestyle created the initial three main groups of mountain biking categories.

The UCI (n.d.) and British Cycling (n.d.) currently recognise four formats of mountain biking as being competitive in nature (cross country, marathon cross country, downhill, and four cross). In addition, the recent emergence of enduro downhill racing has added another style of mountain biking to the list of competitive formats (Wragg, 2012; Bike Radar, 2013). Despite it being as yet unrecognised by the UCI, this still represents a race orientated format of mountain biking and was classified as such in this study. Therefore, the three initial categories were further classified and refined into five separate markets using competition as a delineating factor. This creates a reflective nature to the competitive-non-competitive dichotomy in mountain biking within both the trail riding and gravity markets. Where a competitive format exists there is also a non-competitive style of mountain biking that sits close by on the common space diagram (e.g. cross country and trail riding, enduro racing and all mountain, and downhill and freeriding). This creates a choice for consumers in that they can either opt into, or out of, competition via the riding style they choose to take part in. Racing was at the heart of the birth of mountain biking (Berto, 1999; Savre et al, 2009; Savre et al, 2010) and therefore the non-competitive markets arguably represent a deviation from the original core principals within the sport. However, it does echo the rejection of traditional sporting ideals that

has become engrained in extreme sports (Beal, 1995; Humphreys, 2003; Wheaton, 2003a; Wheaton 2003b).

The third category, freestyle has a non-competitive focus and shows distinct similarities to BMX (Dodds, 2009). Like mountain biking, the BMX market is also fragmented into several market segments. It is interesting to note that particular forms of BMX (street riding and dirt jumping) are also reflected in freestyle mountain biking and so the external influence is clear. What is more interesting about this market segment however is the absence of competition. Yes, there are competitions but these are invitational events, scarce in number and not open to amateurs, making freestyle the only entirely non-competitive mountain biking market for participants.

The results highlighted that a clear link can be drawn between the contexts within which the activities take place and the products offered to consumers. Products appeared within the sample with clear definitions and descriptions regarding the purposes that they could be used for. This indicates a high level of specialisation within the mountain biking market and emphasises the solidified status of the market segments themselves. Where different manufacturers attach the same labels to similar products, this can be seen as standardisation and emphasises the difference between markets. There was however a caveat to this within the study findings, which appeared in two cases, the connection between downhill and freeride mountain biking and the universality of products within the freestyle market.

Within the sample of products it was common for freeride bikes to be referred to as being usable for downhill racing and visa versa. This is also replicated in the mountain biking media where freeride and downhill bikes have been described as

being “pretty similar” when purchased “off the peg” (What Mountain Bike, 2013, p.9). Likewise in freestyle, products were almost unanimously described as being useable for dirt jumping, street or slopestyle riding. Therefore the data not only presented a picture of differing market segments but also provides examples of where markets came together.

Where differences between products did exist this can be linked to the activity context and environment in which the equipment is designed to be operated within. The most obvious of these factors is the amount of suspension that a bike possesses. For instance, downhill racing and freeriding involves riding rough descending pistes, which often includes drops and jumps that require higher levels of suspension. Bikes with less suspension (e.g. trail or cross country) would simply be unable to cope with the rigors of these types of riding.

This same principal can be applied to other non-freestyle formats of mountain biking. The original MDS analysis identified a trail riding category containing cross country, trail riding, all mountain and enduro downhill. This was later categorised as four separate markets due to the clear differences between the products and in particular the amount of suspension that a bike possesses. However, something subtler emerges here related to the activity formats. Where the terrain and the styles of riding involve an increasing focus on downhill trails, then the suspension increases significantly between formats. However, when Kesteven (2013, p.110) suggests that enduro downhill bikes are “light and efficient-pedaling enough to enjoy a day of self propelled riding, but won’t hold you back on a full-on downhill section” he highlights the fact these bikes also need to be able to be ridden up hill, differentiating them from

gravity bikes. In effect they are ‘do it all’ machines, which sit in between short suspension cross country bikes and more plush downhill and freeride products.

Conversely, Bike Radar (2013) suggests that any trail or all mountain bike with between a 140-170mm of suspension could ably be used for enduro riding. So there is confusion within the market and this is also reflected within the findings of this study. Enduro bikes do not sit directly between cross country and downhill in terms of the level of suspension. This study found that suspension incrementally increases from cross country through trail riding, all mountain and finally enduro downhill before coming to the largest level of suspension of all in downhill or freeride bikes. The idea of a “do it all bike” has been a subject of debate in the mountain biking press and in a recent editorial Cunningham (2016) announced the ‘honeymoon’ between trail riding and enduro racing was over. In doing so he indicates the separation of formats and in effect the formation of different markets, a fact supported by the findings of this study.

Forster (2016) also asked questions over the continued evolution of the geometry of the modern mountain bike, using the opinions of leading product designers. This highlighted the design of bikes being governed by the style of riding they are purposed for and this is replicated in the differences in the head angles and wheel bases between trail riding and all mountain, found within this study. However, this becomes more confused when all mountain and enduro downhill bikes are compared and the results of this study show that products in these two markets do not differ in their geometry, other than in the respect of the amount of suspension that the bikes possess. So where differences were pronounced between both cross country and trail

and with trail and all mountain, differentiating all mountain and enduro downhill was less clear cut and this questions whether these are in fact two separate markets?

The results of this study suggest that they share similarities with the difference being the level of suspension. It could be argued that all mountain and enduro downhill therefore represent two ends of the same spectrum and indeed this has been indicated in the mountain biking press (see Gray, n.d.; iBikeRide, n.d.; What Mountain Bike, 2013; Kesteven, 2014). However, this could equally be true of all non-freestyle forms of mountain biking and it appears that the defining differences between styles of product with the mountain biking markets from cross country through to gravity, centers on geometry and particularly levels of suspension. This in itself creates a spectrum of products across these five particular markets (cross country, trail riding, all mountain, enduro downhill and gravity).

The emergence of the all mountain and enduro downhill is interesting in terms of market analysis. They indicate a consumer desire to purchase products that cut across boundaries and defy characterisations in less flexible categories like trail riding and gravity. They represent ‘compromise products’ that allow riders to ride up hill but not at the expense of the exhilaration of the fast descent that follows. Previously it was common for participants to develop a collection of bikes, often referred to as a ‘quiver’ (Harris, 2014), but the emergence of enduro downhill and all mountain bikes has questioned the need to own a separate trail and downhill bike. For most consumers this was always an unrealistic option, particularly in light of the recent global economic crisis and it is unsurprising that ‘jack of all trade’ bikes are increasingly popular. Indeed, it is common to encounter considerable online debate amongst mountain bikers over which enduro or all mountain bike would make the

perfect “quiver killer” (IMB, 2013; Dunn, 2014; Sumner, 2014; Pink Bike, 2014; Singletrack, 2014). This, along with the tangible differences between the styles of mountain biking formats, indicates a strong and reasoned argument to suggest that cross country, trail riding, all mountain and enduro downhill represent differing markets within the sport. These formats along with freestyle and gravity constitute the six different markets within mountain biking.

The discussion presented here, has thus far focused on the specificity of the products and the development of differing styles of mountain biking as particular market segments. However the results of this study indicate that something much more pronounced, intricate and hierarchical is in play within the mountain bike market. Through the analysis of components it was possible to develop a model of hierarchical market segmentation within the sport of mountain biking (figure 7). This was based on the type of components, their quality and price as well as their specificity to particular formats of riding. The results indicated that there are four levels within the mountain biking market but also that not all six segments exist at each of these levels within the market.

In observing the individual bikes it became clear that significant specialisation occurred at the enthusiast level where the trail market, which was homogenous at the beginner and participant levels, separated into three different categories and this is arguably a process of the costs of the components needed to fulfil specialist needs. For instance, in trail riding a full-suspension bike would cost in the region of £1500 (Muldoon, 2013). However a ‘proper’ gravity bike would cost £2500 (Ireland, 2013, p.137), indicating the difference in the costs of products at similar levels of the hierarchy, within different markets. Therefore it is important to point out that the

model presented to define the market structure does not signify uniformity of price across markets. Rather it defines the place of products within each independent market segment as part of the progressively structured pricing system.

The beginner market represented the entry point into mountain biking for consumers and within the cross country and trail riding market, bikes retailed up to £1000. This indicates an emphasis on affordability, which was also highlighted in the basic nature of the components on the bikes. This again tallies with the mountain bike press where ‘Starter Bikes’ appear at around £400 (Rogers, 2012) and end where the ‘proper’ mountain bikes emerge at around £1000 (What Mountain Bike, 2016b).

The other entry-level market was in freestyle, where the most expensive beginner bike costs under £700. Across all four levels of the market hierarchy, freestyle presented products at a far lower cost than the other markets (participant market £700-900, enthusiast market £900-1200 and elite market £1200-1700). This may relate to its close association with BMX, which has also been shown to be a cost effective form of cycling (McLaughin, 2012). BMX products could therefore be viewed as competitors to those within the freestyle mountain biking market and if bike prices were higher this would then simply price these products out of the marketplace.

In the participant market, gravity bikes retailed between £1900-3000 and in cross country, products ranged from £1000 to £2100. The merged trail riding participant market presented interesting results as products labelled as trail bikes demonstrated similar component characteristics up to a price of £2500. However, in the all mountain format, the enthusiast market began at a price of £1500, indicating an

earlier separation from trail riding, compared to enduro downhill where the enthusiast market began at £2300. The similarity of products that were merged to form the trail market provides evidence for the possible confusion related to the difference between trail riding, all mountain and enduro downhill. It is simply that at the lower levels of the market, products in these formats are similar and that three unique markets only appear in the higher levels within the hierarchy.

The elite market, which was populated across all markets segments by high-tech products with the latest high performance components, also varied in price going up to £8000 (cross country) which was the most expensive bike within the sample. Overall this indicated a level of independence of pricing at each of the four levels, within each of the six mountain biking markets.

It is also recognised that in defining the mountain bike market through this research, new avenues of analysis have been opened. Firstly, the model of market hierarchy could be interrogated in more depth and the logical next step would be to evaluate the consumers within the each market segment. This could equally relate to either the differing formats of mountain biking as market segments or the levels within the market hierarchy. The results of this study also highlight the differences in equipment and how bikes are designed for differing purposes and lead to another area of future research, connected to the behavioral characteristics attached to the differing formats of the sport and their influence on product design. As socially constructed technologies (Rosen, 1993), mountain bikes themselves link with culture. Indeed Huyber-Withers (2015) presents a strong case for the important role that equipment has played in the evolution of mountain biking subcultures. Therefore further research in this area could serve to bridge the gap between market and subcultural

analysis and develop a greater understanding of consumers within the mountain biking market and their identities.

Conclusions

In conclusion, the study found mountain biking to be a fragmented, complex and highly specialised market. The findings revealed a market represented by six core segments (cross country, trail riding, all mountain, enduro downhill, gravity and freestyle) and that these exist within a hierarchical structure. The study also concluded that at the entry to the mountain bike market only three formats exist and it is only at the subsequent levels of the hierarchy that further specialisation takes place. This was best identified by the trail riding market, which specialised into three separate and distinctly different markets only at and beyond the enthusiast level. Therefore this study suggests that price and product specificity are linked within the sport of mountain biking and it is hoped that the findings of this study provide a foundation upon which to build further analysis of the mountain bike market.

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ⁱ The manufacturers included: Cannondale; Commencal; Cube; Felt; Focus; Ghost; Giant; GT; Haro; Kona; Lapierre; Mondraker; Mongoose; Norco; On One; Orange; Rocky Mountain; Scott; Trek; Turner; Whyte; and Yeti.

ⁱⁱ For definitions of individual riding styles please see Gray (n.d.), Kesteven (2014) and iBikeRide (n.d.)

Figures

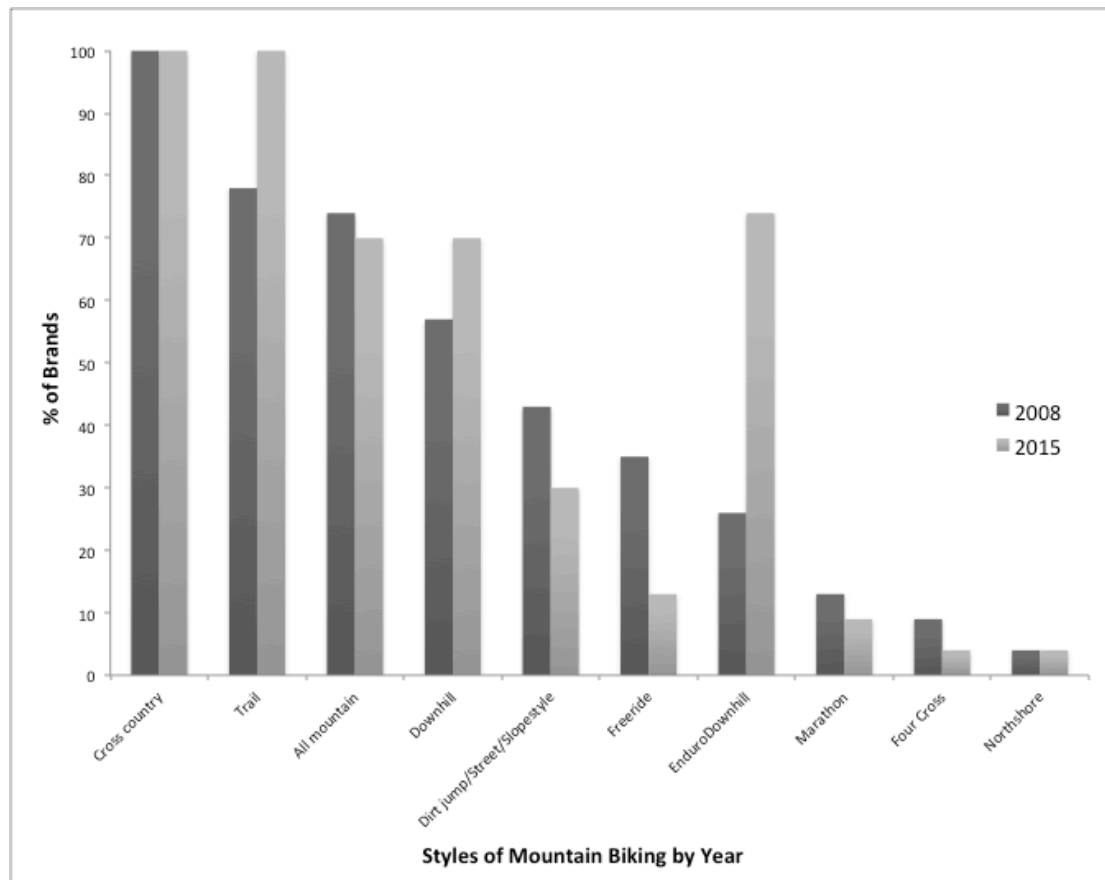


Figure 1: Percentage of brands offering products (bicycles) to the market in each of the mountain biking styles (N.B. dirt jump, slopestyle and street format were combined due to the use of the same bikes across all three of these formats).

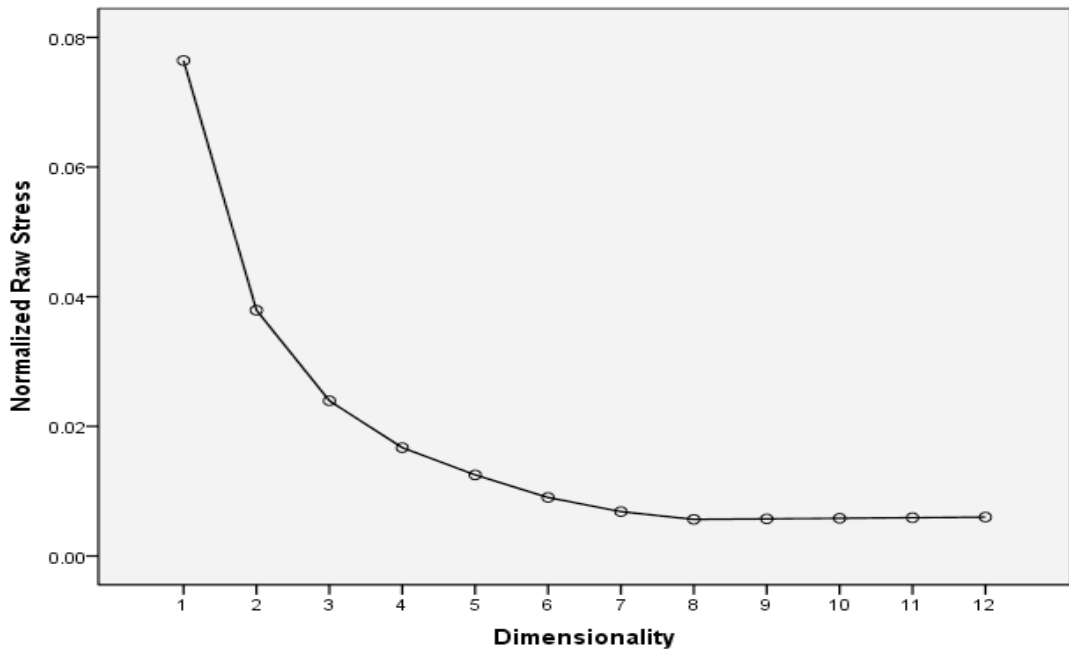


Figure 2: Scree plot for the dimensionality of difference within responses given on the differing characteristic nature of sub-styles of mountain biking.

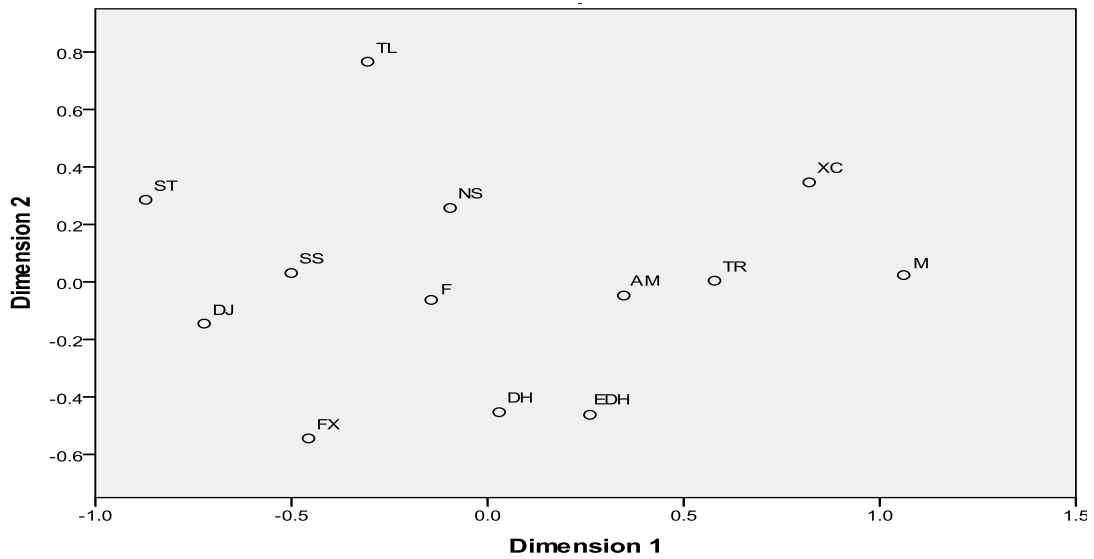


Figure 3: The proximity common space diagram for the results of paired riding styles (XC=cross country, M=marathon, TR=trail, AM=all mountain, EDH=enduro downhill, DH=downhill, FX=four cross, F=Freeride, NS=northshore, SS=slopestyle, DJ= dirt jumping, ST=street and TL=Trials).

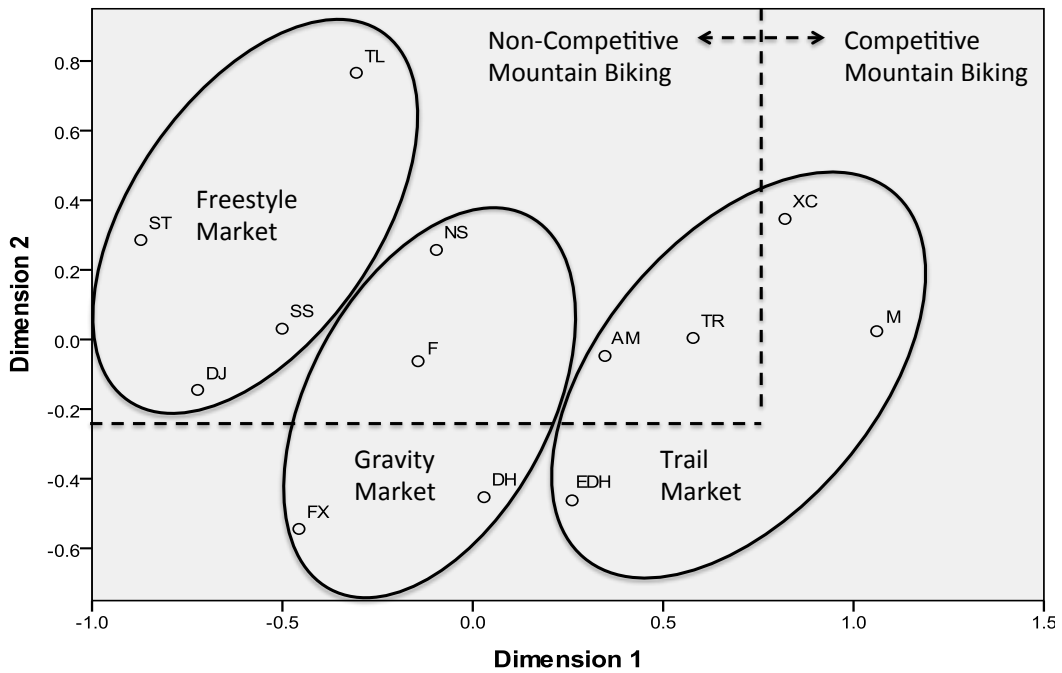


Figure 4: Initial market classification based on activity context and competitive/non-competitive orientation

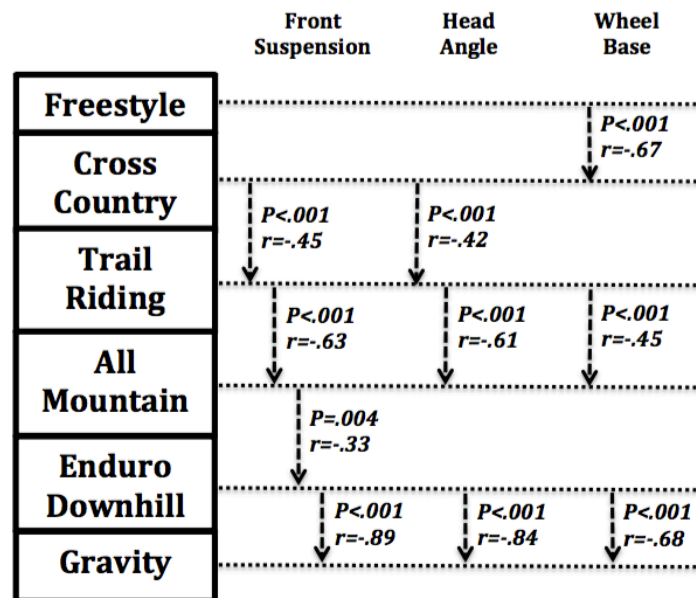


Figure 5: Bike geometry and market difference

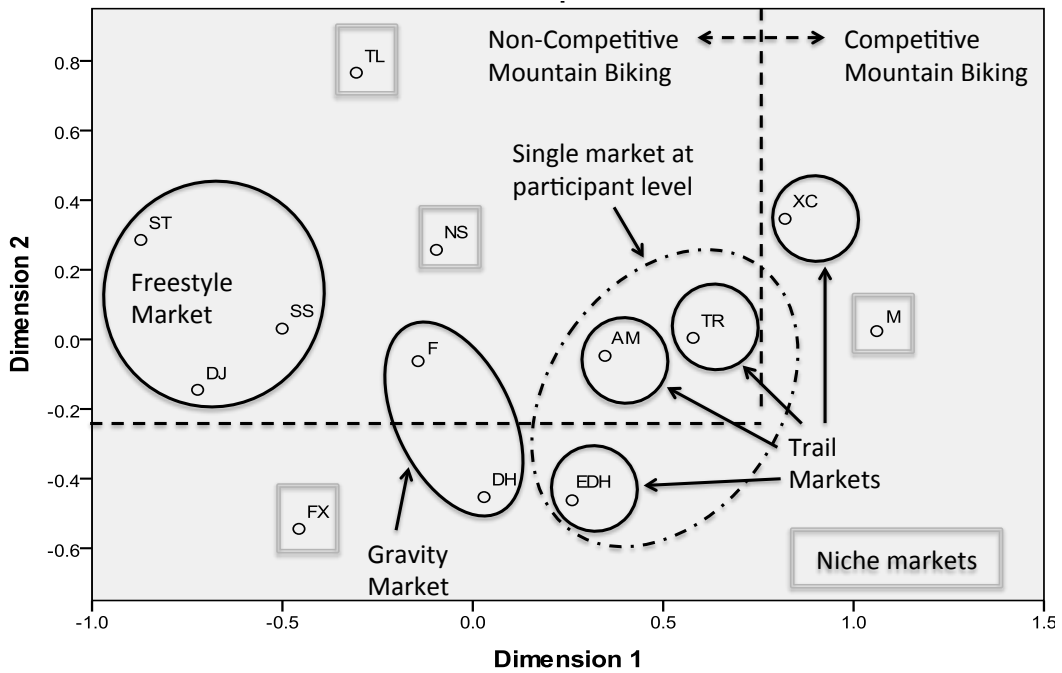


Figure 6: Revised analysis of the MDS results following product analysis.

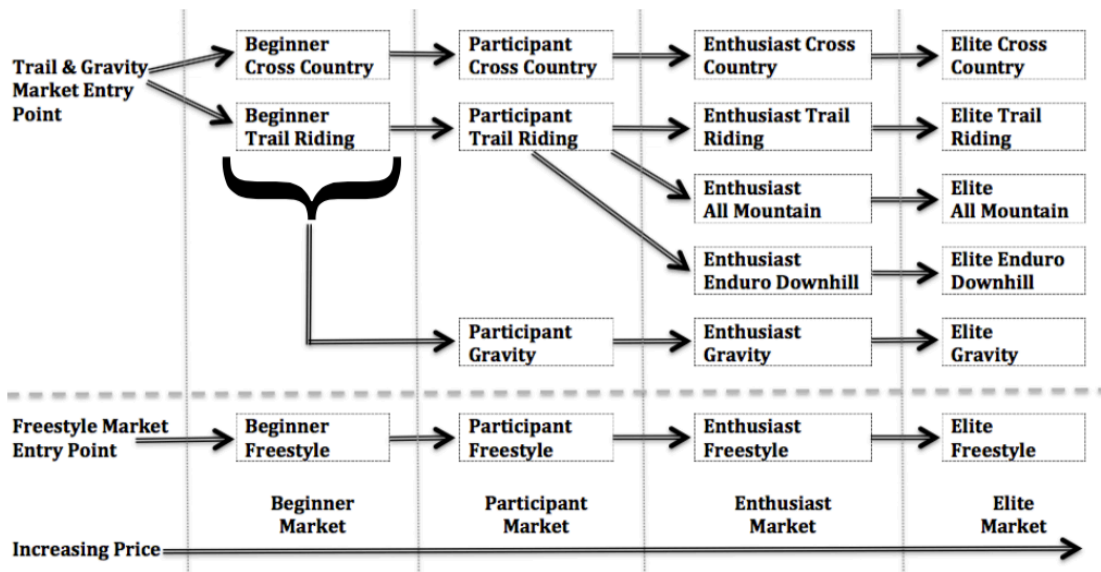


Figure 7: Hierarchical model of the mountain bike market