Why Does Sports Equipment Sometimes Become Too Sophisticated and Expensive? A Case Study of the Overshooting Hypothesis in Board Sports

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Abstract This paper investigates innovation overshooting in equipment-based sports, using windsurfing as a case study. Sports, in particular equipment-based, "lifestyle" sports can experience a rapid rise in popularity but eventually technology-driven competition leads to equipment overshooting the capabilities and financial budgets of users. This 'innovation overshoot' leads to a decline in participation and the eventual collapse of the market for the sport's equipment. This progression can have significant adverse consequences for industry and allied sectors of the economy. Models of endogenous overshooting are established in the study of finance and business cycles, and more recently have been extended to the music and design industry. This paper extends this idea to the sports equipment sector where we find clear evidence of technological and market overshooting.

1 Introduction

The purpose of this paper is to better understand how the competitive introduction of new technologies affects the viability of a sport. The hypothesis explored is that overshooting will tend to occur, damaging not only the sport but sectors of the economy that rely on it. This paper uses the equipment-based sport of windsurfing as a case study for this phenomenon.

A sport such as windsurfing, kite-surfing, paddle-boarding or yachting can be economically analysed as an industry made of firms producing equipment, firms supplying the organization, training and competition, and consumers engaged in the sport. A sport has economic benefits, such as employment in manufacture, export, sales and service delivery, and also regional and complementary expenditure multipliers and spillovers associated with the sport's undertaking (clothing,

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A. Pyka, U. Cantner (eds.), *Foundations of Economic Change*, Economic Complexity and Evolution, DOI 10.1007/978-3-319-62009-1_21

media, event tourism and regional branding, among others). Cultural and health benefits also accrue to the success of a sport.

Sports that are significantly dependant on equipment (i.e. most "lifestyle" sports, including board sports) can get caught in technological 'arms races' where oligopolistic competition at the elite high-performance end results in developments that significantly drive up the skill-level and cost of participation (Shah 2000). The unintended consequence of this competition is that it raises the cost of entry into the sport, thus harming, sometimes catastrophically, its long-run viability.

Earl and Potts (2013) , building on Christenson (1997) and Minsky (1982), call this the 'overshooting hypothesis' finding it to be a significant factor explaining the collapse of various genres in the cultural and creative industries where elite artists, competing with each other, overshoot the market tolerance and capabilities of music consumers. The same overshooting is observed in the car industry and in personal computing (Earl and Potts 2014).

The significance of this project is that we are concerned with the sustainability and long-run growth of the technology-driven sports economy, which, in Australia alone, is in the order of A$12 billion (Frontier Economics 2011). We identify technological overshooting as a source of instability and potential collapse in particular sports, and seek to understand that mechanism.

The key idea is that we identify this as an economic mechanism arriving from the unintended consequences of entrepreneurship and innovation-driven technological competition among (as we think of it) duopolists. We seek to understand how this competitive process plays out within and any consequences for the sport itself and associated industries, spillover effects into other sectors (media, tourism, clothing) and social welfare effects (health, community).

This study represents a new approach to sports economics as an application of the study of technology-driven Schumpeterian competition in industry dynamics (i.e. the overshooting model, Earl and Potts 2013). We also develop a new data source built on industry interviews, grey-literature and sports magazines that trace the technological changes, price points, governance concerns, and consumer issues through the trajectory of the industry. The paper is organized as follows: in Sect. 2 I present a review of the literature specific to sports innovation, in Sect. 3 I discuss the method of data capture, in Sect. 4 I present the history and innovation trajectory of the case study sport based on the primary interview and grey literature-based data. Section 5 summarises the case study findings, presents its conclusion and identifies further work required on the project.

2 Literature

Central to the technological innovation literature is the idea that firms, supported by strong intellectual property right regimes, drive product innovation (Schumpeter 1934; Demsetz 1967; Nelson and Winter 1977, 1982). This focus on firms has produced many important theoretical insights into the formative years of industry

development, including the economics-influenced "product life cycle view" and the sociological literature on organizational fields and populations. In the product life cycle view, it is technological innovations, often in the form of spillovers, that give rise to new industries: firms enter the emerging industry under conditions of technological and market uncertainty and they experiment with various product designs and features to attract and satisfy customers. The combined effort of these firms leads to subsequent market development. (see, for example, Mueller and Tilton 1969; Abernathy and Utterback 1978; Utterback 1994; Klepper 1997; Agarwal and Bayus 2002). In this view, as in the organisational fields and populations view, the firm is the central actor (Shah 2000).

2.1 Innovation in Sports and the Formation of Sports Equipment Firms

In response to anecdotal evidence from certain sectors of the equipment-driven sports, Shah (2005) argues that existing models that rely solely on firms and research institutions to explain innovation fail to provide insight into the activities of "user-innovators" and the commercial consequences of their activities. Based on an examination of the boardsports industries (windsurfing, snowboarding, and skateboarding), Shah develops a model that illustrates how everyday innovations and social interactions among users can lead to the formation of firms and markets, beginning with "discovery through use." As users of products and services encounter new needs, wants, or use contexts, (e.g. the desire to sail faster, or move from flat water sailing to sailing on waves in surf) they modify existing equipment or a are motivated to seek out new design and/or construction. Some work alone, but many users seek out like-minded individuals with whom to collaborate, forming a *user innovation community,* typically characterized by voluntary participation, free exchange of ideas and innovations and a sense of mutual co-operation. At some point though some of these user-innovators will seek to capitalise on a potential mass market for their invention (or more particularly, the sport or activity that it facilitates) by creating firms to produce and market their goods. Shah finds that the majority of key equipment innovations made prior to the growth of the mass market are made by users and user-manufacturers. An increase in innovative activity by manufacturers occurs only after the mass market begins to grow rapidly and commercial enterprises (sometimes from other sectors) see the market potential of an emerging sport. This manufacturer activity is more often devoted to solving known problems for users or refining the performance characteristics of existing products (e.g. adding footstraps to a sailboard to allow a user to jump waves and remain in control of their board, or refining hull shapes or construction methods to make craft faster and lighter) rather than creating new product uses or truly novel new features.

In a similar vein, Hienerth (2006) documents the evolution of the fringe sport of "Rodeo Kayaking" from a user-innovation community to a "sport-industry". As in previous studies on user innovators (Shah 2000; Franke and Shah 2003), Hienerth chooses an extreme sporting industry to analyse the development and commercialization of innovations. The development of user innovations and commercialization in the rodeo kayak industry, similar to other sporting industries, came about from the matching of different stimuli (Lynn et al. 1996; Howells 1997). Some of these stimuli were more personal and technology oriented, others were created by a growing market. Lead users started innovating because of a technological gap—they had needs that could not be met by existing products or materials. The users themselves found new ways to shape and process materials, generating new, technically advanced products. As people bought new products, lead users had the chance to further develop new products and materials using external cash flow. The switch from personal demand and technological superiority to market demand leveraged the commercialization of user innovations. Similarly, Roberts (1988) has mentioned that market pull stimuli are responsible for the final success of innovations, although different kinds of stimuli can be sources for initiating innovations, and Gans and Stern (2003) have shown that a commercialised environment is important to the economic success of an invention.

Baldwin, Hienerth and Von Hippel extend this work to explore more thoroughly the examination to the formation of firms by user innovators and/or the adoption of their ideas by manufacturers. They find that in general, one or more communities of user-innovators will soon coalesce and begin to exchange innovation-related information. Sometime after user innovation begins, the first user-purchasers appear—these are users who want to buy the goods that embody the lead user innovations rather than building them for themselves, either as new users seeking a more convenient entry pathway to the sport or for existing participants to maintain a competitive position with the innovators. Manufacturers emerge in response to this demand. The first manufacturers to enter the market are likely to be user-innovators who have access to the flexible, high-variable-cost, low-capital production technologies they use to build their own prototypes. The relatively high variable costs of these user-manufacturers tends to limit the size of the market initially but as information about product designs is disseminated, and as market volumes grow, manufacturers, existing user-manufacturers and established manufacturers from other fields (who may bring their own innovations or refinements to generate manufacturing efficiencies) can justify investing in higher-volume production processes. These processes bring lower variable costs, their use may drive prices lower and expand the market. User-purchasers then have a choice between lower-cost standardized goods and higher-cost, more advanced models that user-innovators continue to develop. Finally, as a design space matures, the rate of user innovation within that space tends to decline because the expected returns from further design improvements decrease.

2.2 *Overshooting*

While the mechanism of innovation in equipment sports and the subsequent evolution of firms in the sector has been documented and is reasonably well understood, there has been little-to-no rigorous enquiry into what happens *later*... there is anecdotal evidence of equipment innovation in sports, driven by brands and manufacturers' desire to stay ahead of the pack by offering the faster, lighter, more specialised (and often more expensive) equipment, usually catering to the wants of elite, professional athletes (and promoted and endorsed by those athletes), to the extent that equipment design exceeds the technical capabilities and/or the budgets of the majority of participants. Recreational participants and even the most aspirational enthusiasts leave the sport, leading to eventual collapse of the market for the equipment, with spillover effects into other sectors of the economy (e.g. hospitality, event tourism).

This phenomenon has been identified and explored in other settings. Christenson (1997) argues, mainly in the context of computer equipment, that firms under competition tend to overshoot their markets by adding more features to products and making them more complex, to a point where they overshoot the appetites and/or capabilities of their target markets. Potts (2009) and Earl and Potts (2013) extend this thinking to other creative domains, including the performing arts and the automotive industry and observe that there had been no specific economic theory to explain it to that point. They observe that while under standard theories of production, conditions of diminishing returns will ensure that rational managers will not allow creative concepts to be pursued beyond what is optimal on a production frontier, but that rational choice about how far to pursue a creative product or concept is difficult because the work tends not to be consumable until it is developed to an advanced state. The desire to stay at the forefront, coupled with uncertainty about how far rival producers will take a concept, open the door to collective creative excess. Potts (2009) invokes a Schumpeterian aspect to this, with creative overshooting as a common (indeed expected) response to competition from other creative agents. The competition is for "attention" from consumers and creativity is a necessary input. In addition, the designers and manufacturers, as "creative producers", have more knowledge of their product and its technical nuances and will build more of that knowledge into the product, adding complexity.

In Earl and Potts (2013), the authors go on to propose a "Creative Instability Hypothesis" (CIH), modeled in part on Minsky's financial instability hypothesis. In part their hypothesis proposes that firms competing with each other by continual creation of novelty can systematically overshoot markets. They describe this as, among other things, a market process in which the complexity of creative products needs to match consumers' abilities to recognise, value and consume that complexity. With competitive escalation on the producer side, the consumer side is commonly overshot. This 'Schumpeterian economy' is, the authors argue, creatively unstable and with predictable Minsky-Christensen type outcomes leads to endemic

market turbulence. As a market process they identify it as one in which the consumer is not always able to keep up with producer advances—consumers eventually fail to keep up and lose interest. At the margin, there are constraints on consumer attention and even consumer competence, that when violated lead to market collapse just as if they had violated a price point. To date this effect has not been canvassed at all in the domain of sports and sports equipment literature. As has been indicated earlier, it is the aim of this paper to establish whether there is compelling evidence that this overshooting has also occurred (or is occurring) in lifestyle/equipment sports.

3 Method and Data

Since the primary focus of the study was to understand the evolution of windsurfing as a case study sport, and there is no academic literature or empirical data as yet readily available I chose qualitative data collection procedures. Qualitative approaches are preferred in areas that require theory-building because they "make room for the discovery of the unanticipated" (Van Maanan 1998). Our approach is based upon primary data gathered through interviews with Australian pioneers of the case-study sport and through analysis of international and domestic industry publications and grey literature. Working within the meaning-based tradition of research I adopted an interpretative approach to interviews (Corbin and Strauss 2008). The primary data were derived from semi-structured, in-depth interviews with informants who are selected on the basis of their long standing and experience in various roles within the sector (see Table 1 for details). Long interviews allowed access to informants' first-hand personal experiences and meanings associated with their engagement in boardsports as participants and as long-established members of the associated industry, either as retailers or wholesale distributors.

Table 1 Informant profiles

Informants	Role in industry	Industry/sport tenure at 2014 (approx.)
1. WL	Retailer, instructor, former elite participant	28 years
2. AM	Retailer, former participant	24 years
3. DS	Retailer, current participant	12 years
4. LM	Distributor/manufacturer	32 years
5. GJ	Importer/distributor	38 years
6. HF	Importer/distributor/retailer	22 years
7. AQ	Importer/distributor, former elite participant	26 years
8. DJ	Former elite participant	35 years
9. MM	Importer/distributor/retailer (retired)	38 years
10. IF	Distributor/manufacturer	32 years

3.1 Procedure

Informants were asked a mix of grand tour questions and floating prompts (McCracken 1988). At the beginning of the interview, informants were asked to provide some background on their history in the sport and their current role in the industry. Since the informants would approach this question with personal stories or experiences, further prompts were used to understand the significance of their role in the sport/industry or user experiences. Following a general discussion interview questions then focused on: (1) interviewee background, experience and role in the industry (manufacturer/importer/distributor/retailer/athlete); (2) history and evolution/rise and fall of the sports as they saw it, such as how does it happen, how fast has it happened; (3) consequences of rise and decline for them and associated industries/business, (4) regional economic implications; (5) views how to avoid repeating the same 'mistakes' in the future.

Although the interviews were broad and only semi-structured, informants were asked to elaborate on various statements they made, provide more explanation for their experiences, comparisons of consumption or usage and brands they referred to, and elaborate on the personal relevance of the subject matter. Given this method, informants spoke for virtually the entire period, with the researchers only engaging in floating prompts (following the initial grand tour question), asking for clarification on certain terms and every so often, summarizing informant responses or views. Interviews lasted on average an hour (615 minutes total interview time). Interviews were audio recorded and transcribed *verbatim,* resulting in slightly more than 229 pages of text. Interviews were continued until saturation on the key themes of the trajectory of windsurfing as an industry and as a sport were exhausted (Creswell 2009).

Analysis began with the transcripts which were read in detail and meanings interpreted by the organisation, comparison and interpretation of various themes and meanings drawn from the transcripts (Malterud 2001). Throughout this procedure preliminary results were compared back and forward between the available trade, market and grey literature on the sport and includes both descriptive and interpretive explanations of the raw data (Kruegar 1988).

4 Case Study: The Rise and Fall of Windsurfing

4.1 Industry Inception and the Early Years 1970–1980

The "creation" of the windsurfer as a user-innovation has been documented in Shah (2000) and elsewhere (Pryde 2010; West 2012, among others). Briefly, several people have laid claim to inventing the windsurfer but Californians Hoyle Schweitzer and Jim Drake made the claim loudest. In 1968, Schweitzer and Drake filed the first patent on the craft, which was granted to them in 1970. U.S. Patent #3,487,800

was issued, and covered a "wind-propelled apparatus in which a mast is universally mounted on a craft and supports a boom and sail." The two inventors called their creation a sailboard.[1] The critical innovation in the patent was the incorporation of a molded rubber universal joint that secured the mast and sail rig to the board, allowing the rig to pivot freely and the user to steer the craft buy tipping the sail forward or aft.

Schweitzer and his wife Diana set up the company Windsurfing international to manufacture, promote and license windsurfing designs. The patent was jointly owned and wholly licensed by Drake and Schweitzer to their company Windsurfing International. In 1973 they registered the term "windsurfer" as a trademark and in that same year Drake sold his half of the patent to Windsurfing International for US $36,000 (Pryde 2010).

Schweitzer embarked on an ambitious licensing programme to encourage manufacturers to take up production using his patented universal joint. Early entrants into board manufacture were generally not from the surfboard industry (which was largely a cottage industry at the time) or otherwise associated with watercraft. Early windsurfer boards and their imitators were typically a roto-molded hollow structure or were constructed of a molded plastic skin bonded to an Expanded Polystyrene (EPS) foam core and seam-welded. The early manufacturers to adopt Schweitzer's design principles were in the main from the plastics industry—for example, in Europe, Mistral was a molder of plastic buckets, bins and brooms, BiC a manufacturer of ballpoint pens[2] and in Australia the "Bombora" and "Tyronsea" brands arose from an Adelaide-based molder of plastic lavatory seats and water tanks.

When Schweitzer first introduced the Windsurfer at boat shows in the early 1970s, some practical jokers outfitted the sailboard with a huge steering wheel and a portable toilet. But the joke was on the jokers. Windsurfing itself struggled initially to gain credibility in countries that had strong surfing and watersports traditions but in places like Germany, France and Holland that had no strong surfing culture it very quickly became a "cool" sport (Pryde 2010). Largely because the Schweitzers had been so dogged in promoting it, boardsailing had become the world's fastest growing sport. In Europe, where by the end of 1981 nearly 1 million boards had been sold, the sport was second only to skiing in the number of participants. According to Boardsailing U.S.A. figures of the day, 50,000 sailboards were sold

[1]The patent was ultimately challenged by several parties. British user-innovator Peter Chilvers claimed to have invented the concept in 1958 and American inventor Newman Derby published plans in 1965 in *Popular Science Monthly* magazine. Schweitzer strained his financial resources fighting big manufacturers over patent infringement through most of the 1970s. In *Windsurfing International vs Tabur Marine (Great Britain)*, Tabur, then a division of BiC, referenced the Chilvers and Derby designs to successfully argue that the design was not new. Schweitzer's patent was overturned in February 1980, reinstated on appeal in March 1981 and ultimately denied again on further appeal in June 1981 (Mamis 1982).

[2]After the withdrawal of Schweitzer's patent, BiC Sports entered the market in large scale in 1981 with the "DuFour Wing", a cheap sailboard package that "was to do for sport what the biro had done for office supplies" (Pryde 2010). The BiC package retailed in the USA for around $700 which at the time was 30–50% cheaper than other brands, some 12,000 were sold in the first year.

in the Unites States in 1981 with projections for 50–75% annual sales growth for the next five years. Outside the United States, there were over 100 sailboard makers, most of them doing business without a license from Windsurfing International (Mamis 1982). In 1982, a single sail manufacturer had sold 340,000 sails worldwide (Pryde 2010).

In Australia, the sport began in a modest way with the first Schweitzer windsurfers being imported in 1976 by a Sydney-based sailing enthusiast. A distribution agreement soon followed. By the early 1980s the sport in Australia was booming, with dozens of thriving retail outlets, particularly on the eastern seaboard.

> "*In its peak, through the early to mid '80s you had specialist retailers as well as camping stores that were selling windsurfers, as were ski shops and boating centres. In Victoria, (there were) upwards of 50 different outlets reselling windsurfers in some shape or form. On the eastern seaboard alone, there were in excess of 100 or 120 shops selling windsurfers...where I was working at [de-identified, retailer] it wouldn't be unusual to have 200 boards in stock wrapped up and on a busy weekend you might sell 80 windsurfers...we were like worker ants just running around unwrapping things and taking them out and tying them on people's cars*"
>
> *Retailer*

4.2 The Turning Point 1980–1985

After the initial drive for market footprint and the initial upsurge in worldwide board sales, there would be a fork in the road. BiC Sport among other European manufacturers would continue to follow the populist route, with an emphasis on simple, low-cost equipment and primarily flat-water, sailing-based participation. In parallel, new developments in Hawaii would kick-start the performance windsurfing movement (Pryde 2010). In Europe and North America, the sport was still very much recreational but in Hawaii, windsurfing was transformed into a much more technical, performance-based, athletic sport. Hawaii's consistent winds and big waves were encouraging a small group of designers and sailors to try new things. Elite users of the day, including Robbie Naish, Mike Walsh and Matt Schweitzer, among others, stretched the capabilities of the bulky, long boards of the day to perform fantastic acrobatic stunts (Pryde 2010).

"The Hawaiians", as they became known, started to make significant changes to their equipment to exploit their local conditions. Boards became shorter to make them more maneuverable, were made lighter and with less flotation to make them faster, but with this, the boards (and sailing rigs) required a higher level of skill to use them. Requests from enthusiasts interested in purchasing the equipment began to come in as people saw or heard about the Hawaiians' innovative equipment. Eventually, their brand, Sailboards Maui, became one of the most popular in windsurfing industry (Shah 2000).

"*The marketing no doubt was probably 75 or 80 per cent skewed towards the advanced sailor. People aspired to be Robby Naish. They didn't want to be Joe Blogs on a heavy windsurfer at a resort with a chewed up sail. They wanted to be either shredding the waves at Diamond Head or winning a race in Europe*"

Retailer

Meanwhile, In Europe and North America, the emphasis was still on more sailing-oriented participation, but the design elements that were emerging out of Maui to make boards faster soon found their way over. In 1982, French rider Pascal Maka bought a sailboard from Sailboards Maui but shaper Jimmy Lewis made a mistake with his planer and decided to turn the accidental gouge in the bottom into a double-concave shape. Maka paired that board with an innovative sail from sail-maker Neil Pryde and the very first hip harness from Maui sails (a device used to suspend the rider from the rig to free up hands and allow the rider to use body weight to control the sail in in stronger winds and at higher speeds). Maka took his setup to Weymouth, England in October 1982 and set a new speed record of 27.82 knots, a better than ten percent increase on the previous record. Briton Fred Haywood took another Lewis/Pryde setup to Weymouth in 1983 and broke the 30-knot barrier, then the holy grail of speed sailing. At a Paris trade show in December of that year a film of Haywood's record run ran more than 1000 times and so many people came to watch it, the aisles in the screening venue were regularly blocked. This attracted many of the then-biggest names in the sport to speed sailing. Sailmaker Neil Pryde, whose sails were used in setting these records said:

we went after the biggest name riders we could find. . .because we absolutely wanted our brand to be associated with fantastic athletes. . .speed and performance.

With this new emphasis on high-performance, manufacturing technology, in particular board manufacture, shifted from relatively inexpensive but heavy, high-volume plastics to lighter, stiffer (and more expensive) "sandwich" construction, consisting of an expanded polystyrene foam core, often hand-shaped and wrapped in a fiberglass and epoxy resin skin. This method of manufacture relied less on complex and expensive tooling that required a long product life and high volume to recover the investment in tooling. The product was, therefore able to be adapted, prototyped and brought to production much more quickly to satisfy the competitive drive of the manufacturers' elite "team" riders and the consequent appetites of aspirational consumers.

"*I guess there were manufacturers that were learning new processes. So to buy a good lightweight epoxy race board. . .even back then a handmade race board was in the vicinity of two and a half to three grand just for the board. . .then brands having world cup team with 10 people on their payroll, paying them big bucks, so they had to provide them with the top end equipment. Of course the trickledown effect, the consumer thought they wanted or needed that as well. I think that's when consumers started to invest big dollars just to stay up with the Joneses.*"

Retailer

"*Very quickly, within a couple of years. . .the emphasis really became about the top end performance of the equipment so it was really about high wind performance, high skill level . . . driven by the professionals. It was a positive. The equipment became a lot more high*

performance which was great for the more advanced ***but*** *(emphasis added) all the companies there at that time put most of their efforts into technology changes that would benefit only the elite end of the sport*"

Manufacturer/Distributor

"*Gear. . .well you'd be spending upwards of 10 to 12 grand a year just to stay at the pointy end. That's before you even think about time on water which maybe means time away from work or family. The keen guys wanted to turn theirs [gear] over every year. The gear was driven hard by the manufacturers to make you think it was that much better than the years before so you had to have it. Also the gear then wasn't well made. You'd break boards, break booms. I'm not heavy but I'd typically break three booms a year, so even a moderately priced boom, $400 or $500 bucks each, a broken board was 2 to 3 grand to replace. . .just for starters. I think in the boom time I had a van, personally I had this van, I probably had four or five boards, anything ranging from a speed board through to two wave boards, a mid-range board, maybe even a race board so maybe five boards. The amount of rigging, sails, booms. masts I think a couple of years I insured my gear it was about $13,000 bucks worth back then, in the early 80's.*"

Retailer, former elite competitor

4.3 Decline and Fall 1985–2000

In the early days of the sport, the equipment was rudimentary, despite a high degree of enthusiasm there was still a relatively steep learning curve for most newcomers:

The equipment was heavy, hard to use, had a fairly broad wind range of use but comfortable in none of them. I think the way to describe it at that was the early part of it was just positive energy, sponsors were involved, media were involved, anyone you spoke to wanted to have a go, most of your mates were doing it. It was the thing you dropped everything for and went as soon as there was a sign of wind or a nice day you—everyone in my social group was sort of dropping that] they were doing to go for a sail or a windsurf. That unified feeling of being part of a movement was pretty powerful.

Importer/Distributor

Windsurfing schools were established wherever there was a suitable body of water and for many new users the pathway into the sport was via lessons from a qualified instructor. As their clients wanted equipment of their own, many of the windsurfing schools evolved into board resellers to capitalise on the business opportunity this presented. As the equipment became more sophisticated and expensive, there was more money to be made (with less effort) by selling equipment than teaching people how to use it. The retailers began to neglect their school operations and many schools closed down. The (unexpected) consequence of this was to close off the "pipeline" of new entrants into the sport (*GJ, importer/distributor, in interview*).

". . . the companies had forgotten about the grassroots level of the sport, forgotten about the entry level part of the sport. The participation at that grassroots level. . .was lost."

Manufacturer/Distributor

"No one was thinking about the longevity or the health of the sport because it was bomb proof, it was going through the roof. So I probably—in '85 roughly when I entered or it might have been a little bit earlier, '83 or '84 the sport was probably nearing the apex. But no one was really talking about managing post the apex of the sport. So at that stage of the sport as a brand to survive you had to be new and innovative."

Importer/Distributor

Along with the decline in take-up by new entrants, as the sport and the equipment became more technically demanding, early acolytes and even aspirational enthusiasts began to lose interest and leave the sport:

"... when the focus of the sport takes the sport in a certain direction ...it sometimes leads it away from what its core was. Windsurfing...to most people was getting together with your mates, blasting around having a good time. Then the marketing came that unless you're in the waves, surfing big waves on highly refined wave gear, you weren't cool. Then two things happened, people either felt they're not cool so they won't do it. Or they went and bought the highly refined gear and sunk to the bottom, hated the sport and left."

Importer/Distributor

In 1985, as the performance market boomed, the recreational side of windsurfing crashed and several of the biggest mass producers went bankrupt in that year (Pryde 2010). The decline in entry-level participation also had its effect on the distribution and retail sectors.

"*... you'd have those families coming in, buying a package on a Saturday morning and going out, just wasn't occurring. The sustainability of the stores wasn't there. A rep from [a surviving manufacturer] recently said that in windsurfing's heyday they were manufacturing and selling 700,000 boards worldwide per annum. They're currently doing 70,000. It's a huge decline in the sport.*"

Retailer

By way of example, on east coast of Australia the number of retail outlets for sailboards in Victoria declined from approximately 120 to approximately fewer than 12 by 2000.

5 Conclusions and Further Work

The sport of windsurfing began in the 1970s as a casual and fun leisure pursuit that was reasonably accessible to consumers. Equipment in the early period was relatively inexpensive and somewhat easy to use but relatively unsophisticated, with many new brands and manufacturers entering the market and bringing cross-over manufacturing skills. As seems almost inevitable with physical pursuits, the pastime eventually developed into a highly competitive sport with a range of specialised disciplines (e.g.: speed, surf, racing), necessitating more specialised, sophisticated (and expensive) equipment. In the initial stages of development, at least some of the development was by communities of users frustrated with the performance limitations of stock equipment, experimenting with modifications to what was available and in some instances the more entrepreneurial of these

enthusiasts established firms to bring their developments into production. Driven partly by the demands of elite competitors and partly by relentless competition for market share, manufacturers refined their equipment and materials to the point where using it became beyond the skills and budget of the "average" or recreational user. Indeed, we find that rapid developments in materials and manufacturing process also left many of the early manufacturers behind.

The sport (and its associated industries) then went into rapid decline, with some severe economic consequences for those directly connected with the industry such as manufacturers, distributers and retailers. A view emerged that further decline could be avoided by regulating or standardising equipment, at least for competition, but attempts to do this came too-little-too-late to arrest the decline.

There is clear support for the overshooting hypothesis in this case, with adverse consequences for the sport's manufacturing, distribution and retail sectors. With this evidence, the next phase of this research will be to develop and calibrate a model of sports overshooting, focused on the competitive mechanism, the institutional rules, and the spillover consequences. The intent is to calibrate this against the case study of windsurfing discussed in this paper, extended using back-catalogue studies of trade publications and other archival material including manufacturer and distributor catalogues and price lists where available to estimate real prices of equipment and costs of access. The purpose of the extended work will be to study how this overshooting happens in sports—by what mechanisms and with what cost, with a view to developing economic models of this market and technology process and to arrive at recommendations to both sports governance bodies (in relation to rules and institutions) and to public policy (in relation to funding support) that might mitigate this endogenous instability and the economic harm and social welfare costs that this overshooting causes.

Acknowledgements The author wishes to acknowledge the support of the RMIT College of Business Seed Grants programme for financial support. I would also like to thank the representatives of the board sports industry who have given generously of their time and knowledge in support of this research and Jason Potts for invaluable support and guidance in establishing this research.

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