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evolution in Lancashire and the North West of England**

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# **Cotton Spinning to Climbing Gear: Practical Aspects of Design Evolution in Lancashire and the North West of England <sup>1</sup>**

**Mary B. Rose, Terry Love and Mike Parsons**

## **Abstract**

This article looks at the role of path dependency in the design of outdoor clothing and equipment, from the perspective of changing and overlapping industrial clusters in Lancashire and Sheffield, from the 1960s. It demonstrates that, unlike the fashion market, design in mountaineering clothing and equipment was originally based heavily upon functionality and hence on user innovation. It shows that skills and knowledge which evolved during the industrial revolution, in both industrial areas, were vitally important to the development of internationally competitive mountaineering equipment firms. It was, however, the way in which these sources of knowledge were combined with sporting expertise that contributed to the design of innovative functional products. In addition, fundamental changes occurred in the relationship between manufacturers and their customers and these were vital to the success of this process, marking a departure from past practice.

**Keywords:** Design history, lead user-innovation, mountaineering, path dependency, physical geography

## **Introduction**

During the 1960s the North of England, bordering on the Pennines, and including north Cheshire, Manchester, North Lancashire, Derbyshire and Sheffield, became the home of a number of highly innovative design-based companies, producing clothing and equipment for mountaineering and outdoor sports. These included Karrimor, Troll and Mountain Equipment which, during the 1970s, emerged as international brands. This article focuses on the factors which shaped the design process and design choices in this sector. Drawing especially on case studies of Karrimor and Troll, it explores the extent to which these were linked to the interplay between the industrial, and sporting history and physical geography of the Pennine region. In a sector where, in this period, design was originally moulded by functionality rather than fashion, this article assesses the impact which these design trends had on marketing. The article is divided into four substantive sections, tracking both the continuities and the changes associated with design choices. In the first section the characteristics and relationship between the industries of Lancashire and Sheffield nineteenth century industrial clusters are tracked. This is followed by a discussion of the legacy of the industrial past and its relationship to the shifting focus of British climbing from the interwar period onwards. These sections form the backdrop to the case studies of Karrimor and Troll which are used to illuminate the formation of design choices in the trade and the way in which functionality became linked to marketing strategies in the 1970s. In a final section conclusions are drawn which demonstrate the strong relationship between development of design and industrial and sporting

history and physical geography.

## **Industrial Clusters and Industrial Revolution**

Industrial districts are distinguished by the closely interrelated evolution of skills, knowledge, technologies and products, based upon path dependent characteristics. Path dependency can be defined as:

The influence of past events and of the states they bring about must be communicated –like the deepening of wheel ruts by each successive vehicle –through some definite chain of intervening casual events, effects and resultant states –down to the present state, whence they can be passed on to future events'.<sup>2</sup>

Tacit knowledge, based on learning by doing, is embedded in communities and lies at the heart of theories of path dependency.<sup>3</sup> Learning by doing within industrial regions was reinforced by communities of practice, where shared experience reinforced learning, product and technology development.<sup>4</sup> This is not the same as saying there is something predetermined about the development of innovation or design. Instead, it emphasises the way that history matters in the evolution of innovation and the effect it has upon choices. Regions, their technology and their products have a distinctive history, shaped by the knowledge and experience of those working within them. This means that responses to change and its initiation are based on social processes, which are also shaped by the past. These are, in turn, intimately related to the industrial legacies of two overlapping nineteenth

century industrial clusters, centred on cotton Lancashire and steel Sheffield.

By the late nineteenth century, Lancashire had evolved into the most sophisticated and specialised industrial district in the world, with high levels of vertical, and particularly spatial, specialisation. Indeed it coincided almost perfectly with economist, Alfred Marshall's definition of the classic industrial district where, he observed,

‘ When an industry has thus chosen a locality for itself, it is likely to stay there long; so great are the advantages which people following the same skilled trade get from near neighbourhood to one another. The mysteries of the trade become no mysteries; but are as it were in the air, and children learn many of them unconsciously. Good work is rightly appreciated, inventions and improvements in machinery, in processes and the general organisation of the business have their merits promptly discussed; if one man starts a new idea, it is taken by others and combined with suggestions of their own; and thus it becomes the source of further good ideas. And presently subsidiary trades grow up in the neighbourhood.... Contributing to the economy of its material.’<sup>5</sup>

In nineteenth century Lancashire, the primary focus was textile production and individual communities concentrated on producing distinctive yarns and fabrics using technology that evolved synergistically.<sup>6</sup> By the First World War interrelated business sectors were involved in the manufacture of over 300 different fabric types, the production of synthetic dyestuffs, a strong printing and newsprint industry, textile finishing trades, coalmining, and a massive rubberised rainwear industry.<sup>7</sup>

Manchester was far more than just an industrial town: it was the commercial

heart of a spatially specialised industry and the crucial link with the outside world. Manchester's commercial sector acted as a conduit for intermediate goods and services with numerous shipping houses linking manufacturers with diverse national and international markets.<sup>8</sup> The city was also the base for numerous other institutions that facilitated information flow. Its networks of information and commercial intelligence were brought together through the Manchester Royal Exchange, described as the 'nerve centre' of the industry.<sup>9</sup> The wide range of merchant converters and finishing companies in the Manchester region were at the very heart of the Lancashire system. However, they meant that very few manufacturers had direct contact with their customers and user lead innovation was very rare.<sup>10</sup>

Community development was especially linked to accumulated and distinctive capabilities tied to specific products, geared to particular markets. The expansion of south Lancashire's spinning was closely linked to the perfection of steam power and the growth of textile engineering. Such interaction and skill building within Lancashire towns was reinforced by the ties between machine makers, who had inputs into the curriculum of local technical colleges.<sup>11</sup>

The development of machine tools, engineering and related skills in the Manchester region lay at the heart of Lancashire's textile capability. Technology develops in an evolutionary path-dependent manner, shaped by past skills and the transfer of knowledge within industrial communities. The role of technology-based path dependence in business development is especially well illustrated by Lancashire's engineering legacy. In the UK, after

centuries of craft-based evolution, the first machine shops were closely linked to the development of the steam engine in the eighteenth century, with its need for precision parts. In terms of Lancashire textiles, machine tool development was inextricably linked to the development of engineering aspects associated with the flexibility, versatility and sophistication of textile machinery that gave it competitive advantage. <sup>12</sup>

Innovation in technology is crucially related to personal networks and the exchange of knowledge rather than to lone inventors. Within Lancashire, this was especially true for Joseph Whitworth. He was:

Not an inventive genius but ...sought out the best features of contemporary design, improved upon them and combined them in one masterly synthesis. <sup>13</sup>

Whitworth gained knowledge as a mechanic in the Manchester cotton industry in the 1810s and this was combined with knowledge gained from his employment with Henry Maudslay, the London based originator of screw cutting lathes. <sup>14</sup> The hallmark of his designs was they were made to the highest levels of precision of that time. For example, his 1850s machines could detect differences of one millionth part of an inch (which is considerably better than current general production machine tools). These machines provided the ability to make precision parts and this allowed for more the design and creation of more sophisticated textile machinery. The development of improved machine tools and mechanically more complex mechanisms was also supported by the use of standardised screw threads which was Whitworth's other major contribution to Lancashire's machine building

capability. The Whitworth thread form proved robust, easy to manufacture and, in spite of its relative coarseness is still in use today. These screw threads were to later play a fundamental role in the later development of climbing hardware in the 1950s.

The company of Mather and Platt was a key industrial player in the formation of the Lancashire industrial region and its activities had a subsequent impact on design choices made in the outdoor trade. The company's importance was increased through the active participation of Sir William Mather in the region's economic and social development.<sup>15</sup> The business was originally established at Salford Ironworks, which by 1795 was of considerable capacity and noted for its steam engines according to Boschi,<sup>16</sup>. Colin and William Mather had established a business as *engineers, machine makers and millwrights*, and later joined with the Platt family who had leased Salford Ironworks. In the early days, because of its foundry, Mather and Platt focused mainly on supplying goods for the textile finishing trades, rather than the smaller machine elements for spinning and weaving. William and Colin Mather were designers and entrepreneurs. They developed and manufactured dozens of new *types* of textile finishing machines.

The business had a strong international focus, with Colin and William Mather making many overseas trips. Mather and Platt had central roles in the international development of textile industries of many other countries, notably Russia, India and America. This was to the point that *Matherplatt* became a generic term in textile printing (*Matherplattieren* in German and *Plattning* in Swedish). The nature of the technological choices made by the company and



the evolution of frame, shaft and roller-based machine technologies was to have a significant effect on design choices in the second half of twentieth century.

Another path dependent factor running parallel with these improvements in machine making in the early 19<sup>th</sup> century, was the fundamental shift in the materials of machine making from wood to iron, both cast and wrought and thence to steel. This shift in materials and the associated move away from the wooden gearing of mills combined with, and supported, the development of new machine forms and new *types* of machinery. It brought changes in power transmission that were also crucial to the development of large complex multi-machine arrangements that distributed the power from a single source throughout a building. In addition, the introduction of high-speed linked shafting made possible the later development of effective systems of process control of multiple sub-processes, in for example, cotton spinning, fabric treatment and printing.

The industrial revolution was, of course, not confined to Lancashire and close relationships evolved with neighbouring industrial districts, including Sheffield, the home of specialist steel making. Sheffield's skill and craft expertise had evolved over centuries and reached back to Roman times. Sheffield was the UK's largest nineteenth century centre of specialist steels and in its heyday was the world's largest cutlery centre, and a leading producer of specialist tools. The interface with Lancashire in the nineteenth century lay especially in tool steel –the steels which allow other materials to be shaped. They were of course used extensively by the machine tool makers

so crucial to Lancashire's engineering industry.<sup>17</sup>

### **Industrial Legacy and Sporting Future**

Joseph Schumpeter has been described as the father of entrepreneurship and saw innovation as evolutionary and path dependent. He believed the trajectory of any innovation was intimately related to its historical context. He argued that creativity involves not necessarily developing something new, but having the imagination to see old things in new ways and to move 'outside the ruts of established practice'.<sup>18</sup> Schumpeter's innovation has normally been interpreted as a radical departure from past practice. However, more recent work, which draws on Schumpeter, emphasises the way in which the majority of innovations represent 'new combinations- 'combinations of old and new – old product and new process, old product and new material, old skills and new products.<sup>19</sup> New combinations of old skills, new materials and evolving sports, lay at the heart of the emergence of the internationally competitive outdoor sports companies which appeared on the Pennine fringes in the 1960s. Innovative products appeared in which Lancashire and Sheffield industrial and technical knowledge was combined with sporting skill and needs at a time when the market for climbing and outdoor products was growing at an exceptional rate.

In the 20<sup>th</sup> century, external changes, along with market, and technological shifts, undermined the industrial buoyancy of the two industrial clusters. By the 1970s, the NW textile industry was virtually dead, many mills demolished and Lancashire's industrial past increasingly scrapped or consigned to the heritage industry.<sup>20</sup> The relative decline of the Lancashire cotton industry

predated the First World War and gathered momentum during the interwar period. But absolute decline, when output, capacity and employment in spinning and weaving declined, began after 1939. Forces, including war-time utility schemes, inexperience in Continental European markets, collapse of the Indian textile market, supply side weaknesses, structural changes and government policy - lowered investment and made it hard for firms at the lower end of the market to shift in ways that might have stemmed the region's decline.<sup>21</sup> But not all sectors of cotton textiles declined and nor were skills and accumulated knowledge lost. The textile finishing trades expanded during the 1950s and 1960s as demand for more specialist, protective and high performance fabrics rose. Sheffield's decline was more protracted and in 1964 the city was still the most famous name in steel and the city bore 'all the hallmarks of its nineteenth century heyday'. However, a decade later changes in patterns of world demand and manufacturing generally and reduction in demand for alloy steels in particular were undermining Sheffield's international standing.<sup>22</sup>

The legacy of decline was more than decay, demolition and industrial museums. Some skills, such as cotton spinning and weaving became largely redundant as the cotton industry shifted to Asia. Others, combined in new ways with new materials and uses, evolved to contribute to design processes in a newly emerging sector –clothing and equipment for mountaineering. For example, at the very time that spindleage and loomage was being scrapped, the output of the coating trades grew from £50m in 1950 to £93.6m in 1970.<sup>23</sup> Path dependency and evolving communities of practice played a crucial role in the development of both Lancashire and Sheffield in the nineteenth century.

To a fair degree the decline of both industrial districts stemmed from 'lock in' in a rapidly changing world. Yet there was evidence of creative entrepreneurial responses, which combined the industrial legacy with a parallel sporting legacy, to develop innovative designs.

Technological, social and institutional factors carried forward from the prior industrial context acted as selection criteria for the range of skills available after the collapse of the cotton and steel industries. These factors resulted in a bias toward skills, expertise and working practices that aligned well with the design, manufacture and marketing of innovative outdoor equipment and clothes. Technological selection factors acted, however, against other potential opportunities for the use of human and technological resources available after the collapse of the textile industry, reducing their tradable value (e.g. the main technologies were hard to relocate, and did not have easy technological transfer paths to other commercial activities). This lack of alternative use reduced the relative costs of these resources to entrepreneurs in the new outdoor equipment trade and increased its national and international competitiveness.

The interrelated legacies of Lancashire and Sheffield were the knowledge and skills related finishing processes, engineering and specialist metals all of which in their different ways shaped design capabilities in newly emerging companies. There were residues from the decline of the Lancashire textile industry which impacted on the design of outdoor products. These were less the direct impact of the collapse of spinning and weaving, than the skills embedded in the ancillary trades – both textile finishing and engineering.

These skill bases especially impacted on companies like Karrimor and Troll.

This relationship is not a simple linear one or related to cotton spinning or weaving *per se*. Instead it was linked closely to the high level of nineteenth century specialisation and the consequences this had for the shift to nylon in outdoor products in the 1960s and 1970s. Although there is strong evidence of path dependency, based on Lancashire's cotton past, the process was often complicated. The shift from proofing cotton to nylon was not straightforward. Nylon, invented by Du Pont scientists in 1934 is not naturally a wet weather fabric. Unlike cotton, it does not matter how tightly it is woven, the nature of the fibres prevent it from retaining proofing for long. In steady rain, nylon fabrics/fibres do not swell after absorbing water and hence have no natural ability to repel water as compared with cotton. The consumer today assumes nylon is easier to proof than cotton. The opposite is true, and in the 1970s they faced similar problems to Macintosh before 1850.<sup>24</sup> Indeed as a first step the coating manufacturers used a synthetic version of Macintosh's original rubber to facilitate a physical key to the fabric. However this was extremely heavy and unsuitable and as chemical technologies involved it was found possible to chemically bond the polyurethane (PU) to the very shiny nylon fibres.<sup>25</sup> The skills from Lancashire's rainwear industry, especially those associated with coatings, undoubtedly played an important role in building the competitive advantage of companies like Peter Storm and Karrimor in the 1960s and 1970s and for Regatta in the 1990s. All these outdoor companies relied heavily upon the accumulated expertise of Lancashire suppliers of coatings- some old but some new, for the competitive

performance of their clothing or rucksacks in a changing world.

Karrimor was founded in 1946 by Mary and Charlie Parsons to supply their Rawtenstall cycle shop with cycle bags. It began as a small workshop above the shop and when Mike Parsons joined the company in 1960 he was the 7<sup>th</sup> employee and turnover was 2/3 of the retail store. In building the business, Parsons gained a deep understanding of the manufacturing process and, based within old textile Lancashire of the capabilities of textiles and their associated processes. As an active sportsman he had a working knowledge and regular dialogue with mountaineers and those involved in outdoor pursuits. This bridge between technical knowledge and sporting needs played a crucial role in Karrimor's growing dominance of the rucksack market. By 1975 the company employed 163 workers and controlled 80% of the UK rucksack market, exporting 40% of its turnover. <sup>26</sup>

Mike Parsons and his product manager Eddie Creig developed close relationships with the Lancashire textile industry and especially with coating companies over a 20 year period. As Eddie Creig explained:

'The basic point on any development [is] co-operation and experience. A sharing of knowledge. Although this is concerned with the development of fabrics the same careful co-operation exists between myself and our suppliers of zips, mouldings, met fasteners, foams etc' <sup>27</sup>

During the late 1960s Parsons began to shift rucksack production into nylon and encountered difficulties with the PU coating which regularly peeled off. This resulted in discussions with their supplier, Gordon and Fairclough of Darwen. This small company was founded in 1971 and had worked closely

with Courtaulds before moving into PU coatings. The discussions were robust and ultimately creative as Karrimor product manager, Eddie Creig, recalled:

‘How can you expect to have the correct material if you don’t speak to the people who know what coated fabric is?’ they asked. The resultant meetings always seemed to me the main reason why we have lead the field in our section of the leisure industry... In subsequent years I got to know the dyer that our coaters were using at that time. It was most important that the fabric was properly dyed and only by close contact between dyer and manufacturer (maker up) could he have a real understanding of what was required and why...’<sup>28</sup>

The result of this co-operation in 1979 was the introduction of KS-100e described as ‘a completely new rucksack fabric with a new elastomer coating’ It was the first fabric purpose designed for rucksacks’.<sup>29</sup> Parsons is, however, clear that, while knowledge of coating and related chemical processes was a legacy of Lancashire’s industrial past, tapping into it involved a major break from past practice. Direct contact within the supply chain was not a feature of nineteenth century Lancashire which relied so heavily on specialist merchants at every stage. In addition, while the coating processes were a direct legacy from the nineteenth century, the chemistry involved in achieving a chemical bond between the PU coating compounds and nylon fibres was new. Once this was achieved, however, it was found that the coatings locked up the fibres together so strongly that the tear strength of the resulting coated fabric decreased significantly. It was 10-15 years before new types of the elastomeric coatings were developed which allowed the fabric to regain its

flexibility and hence its strength. KS-100e was the first such fabric to do that.

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Textile processes were a vital part of the nineteenth century legacy but engineering and metal working skills and associated processes were also important. One particularly strong and foundational technological selection factor was the type of large-scale machinery technology used in the North West region. This comprised machinery composed of frames with large shafts and rollers, and was found across a wide range of industries. It is a technology underpinned by foundries, long and large diameter shaft/roller machining, precision tool making and simple process control. The underlying technologies of the innovations of engineering company, Mather and Platt were those of foundry and large machine making – particularly machines with cast iron frames, large shafts and circular machine elements such as rollers, gears, cylinders and wheels. These machines and their associated expertise, originally developed for textiles, became applied to other industries such as printing of lino, steam engines, industrial sewing machines, large volume generation of sterilising fluid by electrolysis, electric motors and machinery and food processing.<sup>31</sup>

The opportunities offered by the existence and extent of this large roller machinery technology acted as selection criteria. Rather than closing, or transforming themselves radically, some businesses in the textile arena used the available machines and existing skill sets in new ways as an opportunity for the production of high-performance coated and treated fabrics described above which were so vital for companies like Karrimor. This in turn acted as criteria selecting against firms that did not utilise these opportunities in some



way, and reduced competition against firms that offered added value in the supply chain through designing products using high-performance fabrics. Karrimor could not have been more firmly embedded in Lancashire. Its early development involved combining old and new technologies, materials and skills with a far higher level of customer interaction than had been common in the cotton industry.

The textile, engineering and metals legacy is only part of the regional story of the emergence of dynamic outdoor equipment companies. Mass participation in outdoor activities such as hill walking and cycling, began in the nineteenth century and grew strongly in the inter war period. But this did not result in a mass market since incomes were low. Before the Second World War, the competitive advantage of UK outdoor companies lay in tents and in wind proof clothing, anything more sophisticated was imported, and this continued to be the case in the immediate post war period. However a range of forces, including increasing leisure time, greater mobility and changing access laws, made outdoor activities more popular. The first ascent of Everest in 1953 made mountaineering more visible and, through its leader John Hunt, provided a vital boost to outdoor education in the UK. The outdoor education centres became a crucial bulk market for UK outdoor companies in the 1960s and 1970s. Demand continued to rise in the 1970s and 1980s, bolstered by the development of activities like backpacking, Scottish ice climbing and skiing.

The Peak District was the heart of the growing level urban climbing and outdoor activity and this was important to innovation and design. The

Derbyshire Peak District, with its proximity to Manchester and Sheffield, became increasingly popular with urban, working class and lower middle class dwellers, during the interwar period. 10,000 walkers visited Derbyshire, mainly from the neighbouring conurbations, on a typical weekend in 1931, many becoming involved in the access movement and the Mass Trespass of 1932.

<sup>32</sup> British mountaineering had its origins in the nineteenth century among the moneyed, public school educated professional elites. The Peak climbers were a new breed who pursued very different 'rules of the game' and had different knowledge and skills. The slump which devastated industries like cotton and steel, in the interwar period, led to a sharp rise in unemployment in both Manchester and Sheffield. Many of them flocked to the Gritstone edges of the Peak District.

'Peakland mountaineering did not share the upper class origins of the sport elsewhere in Britain and the district surrounded by the great industrial masses of Sheffield, Nottingham, Derby, the Potteries and Manchester and its neighbours has been primarily a working-man's playground, while Wasdale and Ogwen remained for a long time in the leisured atmosphere of the traditional climbing families and their friends, there grew up in the Peak District an independent tradition of hard walking and hard climbing that owed little to external influence'.<sup>33</sup>

After the Second World War this group emerged at the leading edge of British climbing and formed the crucial bridge between regionally based industrial skills and the design of innovative outdoor products. Prior to the 1960s, most technical outdoor equipment, from rucksacks to climbing

hardware, was imported.<sup>34</sup> The emergence of this new group of climbers altered the profile of British climbing and influenced equipment development fundamentally. The Peak District climbers shared the outlook and background of Continental climbers who, in the late nineteenth and early twentieth centuries, had developed technical rock climbing in both the Western and Eastern Alps.<sup>35</sup> In the Alps, the combination of industrial, practical and climbing knowledge influenced innovative design of mountaineering hardware and other equipment. This trend was replicated in the areas bordering the Peak District.<sup>36</sup> The emergence of communities of practice, where lead users innovate to meet their own personal needs, sometimes becoming lifestyle entrepreneurs, has been identified in other outdoor sports.<sup>37</sup> What is significant, in the case of the emergence of the British outdoor trade, was the extent to which this activity mapped onto the region's industrial past. This manifested itself in a number of ways, including people who combined the knowledge of materials, manufacturing and craft processes with the demands of sport.

Innovators are involved in the dance of two questions: what is needed and what is possible. The combination of the knowledge of the capabilities of materials, industrial processes and sporting needs was a creative mixture. It played a fundamental role in the innovation and design process in mountaineering and climbing equipment and in the raising of climbing standards in the UK from the 1950s onwards. Being entirely separate, socially and geographically, from the traditions of British mountaineering, the working class climbers 'did not know what they were not supposed to do'. However, they recognised that their gritstone rocks needed technical climbing

equipment. In other words, the distinctive physical geography of the Peak, differed from the Lake District and North Wales, where the mountaineering elite typically climbed. This had a significant impact on equipment development after the Second World War.

UK textile- related equipment for climbing and mountaineering was well developed by the 1960s and often many years in advance of Continental Europe. Climbing hardware, on the other hand, was 50 years behind.<sup>38</sup> Part of the reason for this lay in the ethics of the British climbing establishment, which abhorred artificial aids. Another factor is the physical difference between most of the climbing areas favoured by the British climbing establishment and the Eastern Alps with its big walls , where many of the major climbing hardware innovations originated. However, the creation of a new device-the nut -which did not damage the rock had a lasting impact on the development of climbing hardware design in the UK . The device was called a nut simply because the initial inspiration was an engineer's nut with the thread removed.

The sporting origin of the removable nut, to replace the piton (which was left on the rock face), came from the British practice of threading the rope through a small rock, which was naturally jammed in a crack. Many of the peak climbers worked in engineering workshops and collected Whitworth nuts, filing the threads from the inside, threading a nylon cord through them and using them instead of stones. The first manufactured nut, the Acorn, was made by climber John Brailsford, a one-time Sheffield steel apprentice and blacksmith, who was by 1961 working as a craft teacher in Derbyshire. By

using aluminium die casting, Brailsford went on to develop the much improved MOAC nut, one of the crucial innovations on which the UK mountain hardware industry was based. John Brailsford was not the only innovator in UK mountain hardware, but he became supporting master craftsman for many who came later.<sup>39</sup> This, combined with his shift into outdoor education and later mountain guiding, meant his knowledge had a disproportionate impact on developments in the 1960s and 1970s.

The nut was initially sand cast but once the concept was established many different lead user's and lead user manufacturers explored the 'design space' to use a variety of different production techniques from exclusion to forging. As has been the case in other sports, small lead user new entrants into manufacturing, subsequently developed companies with a worldwide reputation.<sup>40</sup> The physical environment around the companies was very important to their founders, however. It meant they were able to climb in evenings, rather than waiting until the traditional free -time of weekends.

The interplay between practical manufacturing knowledge, craftsmanship and sport is not the only source of path dependence of design in UK outdoor products. The Peak District was the playground of outstanding working class climbers, who emerged as lead user innovators. Of these the best known were Don Whillans and Joe Brown, whose climbing expertise captured the nation's imagination during the 1950s and 1960s. Intensely practical and trained a plumber, Don Whillans had an 'analytical attitude to gear.' according to Pete Hutchinson, owner of *Mountain Equipment*. He was a typical lead user designer- looking for the solutions to his own particular

climbing needs.<sup>41</sup> His classic designs included the Whillans Box, a high altitude tent developed for him by Karrimor and the Whillans sit harness developed with Troll, both of key importance to his move into high altitude climbing in the Himalayas in the 1960s.<sup>42</sup> Some lead users, like Whillans, were not remotely interested in becoming 'life style' entrepreneurs and were not interested in the business side of innovation. There were others, such as Tony Howard, one of the founders of Troll Products. He was a lead user, an innovator and subsequently a manufacturer.<sup>43</sup> The company derived its name from the Troll Wall in Norway, climbed by Tony Howard and his climbing partners in 1965.<sup>44</sup>

Troll Products was located in a small wooden shed in Greenfield, West Yorkshire. Greenfield is a small ex-textile town on the Lancashire side of the Pennines. Historically, its industrial significance lay in its location at the intersection of roads from Manchester to Huddersfield and Holmfirth, and the Huddersfield Narrows canal with its technologically impressive 5km Standedge tunnel that provided the key transport link across England from the Mersey to the Humber estuaries. Waist belts, Troll's first products, were a direct response to the technical climbing development taking place on Peak District gritstone from the 1950s onwards. The shift toward aid climbing meant that climbers were carrying more gear and were tying a rope around their waist. The waist belts replaced this and allowed them to carry more. The design of these simple belts was also linked to the decline of the textile industry, because they were made of old leather belting from local textile mills, although later on this was replaced by nylon webbing.<sup>45</sup> By 1968 Troll Products' workshop comprised three small-interconnected sections, each

about 8 ft (2.5m) square: office, machine shop, and store/polishing room. The business's products around 1968 mainly comprised: 'chocks' (a wide range of metal wedges used in safety protection by climbers), etriers (short ladders for climbers made of nylon tape and stiffened with polystyrene cement), cagoules (knee length waterproof smock made from polyurethane coated nylon with stitched and glued seams).<sup>46</sup>

In 1969 Troll was approached by Don Whillans about the development of what became the sit-harness for high altitude resting during climbs.

'There were no sit-harnesses on the market and Don came up with the idea of a fabric seat linked into the waist belt. We played around with Don's idea and took the fabric out and replaced with web. Eventually we came up with the basic Whillans harness still using mill belting. Although it was initially slagged off by the journalists it took off and nothing replaced it until 1978'.<sup>47</sup>

During this period the company did modify and improve the sit harness but it became the dominant design internationally, as well as in the UK.

Karrimor and Troll were among the pioneer UK outdoor companies in the 1960s but they shared another characteristic. They were among the suppliers of Chris Bonington's 1970 expedition to Annapurna, an expedition which was a turning point for both British mountaineering and British outdoor companies. In climbing terms, the techniques of big wall and technical climbing developed in Continental Europe and America had been further improved by Britain's new breed of climbers. But the high profile media coverage turned the suppliers into international brands overnight. In a retrospective interview, Tony Howard confirmed he saw Annapurna South Face as the key turning point for his company's development through the high profile of the sit harness on photographs, on TV and in the lectures.<sup>48</sup> But this was not just publicity hype, as the sit harness was a break through which

started a whole new level of safety and performance in climbing. Bonington described it as:

‘An outstanding success, for it enabled one to rest back in the seat while jumaring up snow slopes.’<sup>49</sup>

Annapurna 1970 had a similar impact on Karrimor for rucksacks, the Whillans box – the special aluminium framed high altitude tent designed to Whillans’ specification and made by Karrimor using pack frame technology- and the Karrimat. So great was the level of publicity that the company struggled to keep up with demand.<sup>50</sup> Neither company could have survived long had their only market been just leading edge climbing, however high profile. The market is tiny and some of the innovations –such as the Whillans Box- did not diffuse. However, the expeditions enhanced the companies’ reputation for functionality and usability, crucial in the emerging bulk markets linked to outdoor education and backpacking during the 1970s.

## **Conclusion**

This article has demonstrated that design choices in the UK outdoor trade were informed by combinations of past technology and expertise, market opportunity and overlapping networks and the physical geography of the surrounding Pennines. It highlights the ways in which path dependency shaped design choices in the UK outdoor trade after 1960. Many of the problems of declining industrial districts such as the Lancashire cotton industry or Sheffield steel industries can be tracked to the lock in of past technological and industrial choices. This article has shown that path dependency also impacts on decision to innovate and develop new sectors. A



number of internationally competitive companies emerged whose competitive advantage was inextricably linked to the industrial skills and technologies of the past. Innovation came from new ways of utilising these skills and from combining them with the development of sport. The article demonstrates the interplay between Lancashire, Sheffield and the development of climbing in the UK after the Second World War. The mixture of these three sources of knowledge became crucially important to the innovation process in the new outdoor companies. This interplay provided the platform for know combinations of expertise, the blending of tacit knowledge and the mixing of manufacturing and sporting innovation. The proximity of Lancashire and Sheffield to one of the most creative areas of British technical climbing and outdoor activity was critical in this process. Declining industrial regions are normally associated with industrial museums. It is perhaps a reflection of Sheffield continuing position as one of the hearts of the British climbing community that in 1991 one of its old foundries became the Foundry Climbing Centre.

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<sup>1</sup> The authors of this article are crucial to its approach, which combine history, design theory and practice. Mike Parsons was the CEO responsible for the development of Karrimor from a micro-business making cycle bags in 1960 to the UK's largest rucksack manufacturer. Mike is currently innovation director of outdoor equipment manufacturer OMM Ltd. Mary Rose is a business and textile historian with extensive experience researching the outdoor equipment industry in the NW region, and co-author, with Mike Parsons, of *Invisible on*

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*Everest: Innovation and the Gear Makers* (Old City Publishing, 2003) which tracks the evolutionary forces behind innovation in mountaineering clothing and equipment since the nineteenth century. Terence Love worked for Troll Products and Parba Products in the late 1960s (designers and manufacturers of climbing and outdoor equipment) and operated his own business designing and manufacturing specialist mountaineering and sailing equipment to order. This included some of the earliest flexible-pole hoop tents. His current research is regional design infrastructure.

<sup>2</sup> P. David, 'Path dependence : Putting the past into the Future of Economics', quoted eds. L. Magnusson and J. Ottosson, *Evolutionary Economics and Path Dependence*, Elgar, Cheltenham, 1997, p. 123.

<sup>3</sup> M.S. Gertler *Manufacturing Culture: the Institutional Geography of Industrial Practice* Oxford University Press, 2004, p.142.

<sup>4</sup> E. Wenger, *Communities of Practice*, Cambridge University Press, 1998, p.45.

<sup>5</sup> A. Marshall, *Principles of Economics* (London, 1890), p. 225.

<sup>6</sup> M. B. Rose, *Firms, Networks and Business Values: The British and American Cotton Industries since 1750*, Cambridge University Press, 2000, pp. 21-98.

<sup>7</sup> J. F. Wilson and J. Singleton, 'The Manchester industrial district, 1750-1939: Clustering, networking and performance' in *Industrial Clusters and Regional Business Networks*, (eds) John F. Wilson and Andrew Popp, Ashgate Publishing, Aldershot, 2003, pp. 52-5; Levitt, S. 'Manchester Macintoshes: A history of the rubberised garment trade in Manchester' *Textile History*, 17, 1986, pp 51-70.

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<sup>10</sup> Stanley Chapman, 'The Commercial Sector', in Mary B. Rose, (ed.), *The Lancashire Cotton Industry: A History since 1700*, Lancashire County Books, 1996, pp.63-93.

<sup>11</sup> M. B. Rose *Firms, Networks and Business Values: The British and American Cotton Industries since 1750*, Cambridge University Press, Cambridge, 2000, p. 172.

<sup>12</sup> See, for example, *A History of Mather & Platt Ltd.*  
<http://www.zipworld.com.au/~lnbdds/Boschi/book/five1.htm> [accessed 11 Nov 04]; *Maurice Halton's Engineering History Pages*, <http://www.acs.bolton.ac.uk/~mjh1hlc/> [accessed 11 Nov 04]; *Industrial Development of Tameside*, <http://www.manchester2002-uk.com/towns/tameside3.html> [accessed 11 Nov 04]

<sup>13</sup> L.T.C. Rolt, *Short History of Machine Tools*, MIT Press, Cambridge, 1965, pp. 92-117.

<sup>14</sup> L.T.C. Rolt, *Short History of Machine Tools*, MIT Press, Cambridge, 1965, pp. 83-118.

<sup>15</sup> See, overview on Sir William Mather at <http://www.manchester2002-uk.com/celebs/commerce/commerce4.html> [accessed 11 Nov 04]

<sup>16</sup> *A History of Mather & Platt Ltd.* <http://www.zipworld.com.au/~lnbdds/Boschi/book/five1.htm> [accessed 11 Nov 04]

<sup>17</sup> Geoffrey Tweedale, *Steel City : Entrepreneurship, Strategy and technology in Sheffield, 1743-1993*, Clarendon Press, 1993, pp.14-15

<sup>18</sup> Joseph Schumpeter, 'The Creative Response in Economic History', *The Journal of Economic History* 7, 1947,p.152

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<sup>19</sup> William J. Abernathy and Kim B. Clark, 'Innovation: Mapping the Wings of Creative Destruction' *Research Policy*, 1985, 14, p.6.

<sup>20</sup> C. Aspin, 'Cotton's Legacy' in ed., Mary B. Rose *The Lancashire Cotton Industry: A History since 1700*, Preston, Lancashire County Books, Preston, pp. 325-355.

<sup>21</sup> M. B. Rose *Firms, Networks and Business Values: The British and American Cotton Industries since 1750*, Cambridge University Press, Cambridge, 2000, p. 262.

<sup>22</sup> Tweedale, Steel City, p.331-49.

<sup>23</sup> Government Statistical Service, *Historical Record of the Census of Production 1907-1970* (London, 1976).

<sup>24</sup> S. Levitt, 'Manchester Macintoshes : A history of the rubberised garment trade in Manchester' *Textile History*, Vol 17, No.1 pp.51-2.

<sup>25</sup> David A. Hounshell and John Kenly Smith Jr., *Science and Corporate Strategy Du Pont R and D* (Cambridge: Cambridge University Press, 1988) pp. 249-257.

<sup>26</sup> Excerpt from fragmentary memoir of Charlie Parsons in possession of Mike Parsons; e-mail Mike Parsons to Mary Rose 8 May 2000; Karrimor Company Accounts, 1952-1975; Parsons and Rose, *Invisible on Everest*, p. 223-4.

<sup>27</sup> Eddie Creig 'Development of Rucksack fabrics' based on paper given at the 1982 WIRA Conference 'Design for Survival' and included in a series produced by the Equipment Unit convened by Tony Lack.

<sup>28</sup> Eddie Creig, 'Development of Rucksack fabrics' based on paper given at the WIRA Conference, 'Design for Survival' at Leeds, March 1982.

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<sup>29</sup> Karrimor advertising material for KS100e *Climber and Rambler* 1980; Eddie Creig, 'The development of Rucksack fabrics' p. 50.

<sup>30</sup> For a full discussion of KS100e see Mike Parsons and Mary B. Rose, 'The Neglected Legacy of Lancashire Cotton : Industrial Clusters and the UK Outdoor Trade, 1960-1990' *Enterprise and Society* 2005

<sup>31</sup> *A History of Mather & Platt Ltd.* <http://www.zipworld.com.au/~Inbdds/Boschi/book/five5.htm>  
[accessed 11 Nov 04]

<sup>32</sup> Mike Parsons and Mary B. Rose, *Invisible on Everest: Innovation and the Gear Makers*, Old City Publishing, 2003, p119.

<sup>33</sup> Eric Byne and Geoffrey Sutton *High Peak: The Story of Walking and Climbing in the Peak District*, Seker & Warburg, 1966, p.29.

<sup>34</sup> Parsons and Rose, *Invisible on Everest*, pp. 226-228.

<sup>35</sup> Byne and Sutton, *High Peak*, p. 30

<sup>36</sup> Parsons and Rose, *Invisible on Everest*, p.134-162

<sup>37</sup> Sonali Shah, 'Sources and Patterns of Innovation in a Consumer Goods Field: Innovations in Sporting Equipment' *Sloan Working Paper, 4105*, November 2000, 19; Eric von Hippel, *Democratizing Innovation*, Cambridge University Press, 2005, p.19.

<sup>38</sup> Parsons and Rose, *Invisible on Everest*, pp.134-176

<sup>39</sup> Interview of John Brailsford by Mike Parsons, August 2001.

<sup>40</sup> Sonali Shah, 'Sources and patterns of Innovation in a Consumer Products Field : Innovations in Sporting Equipment' *Sloan Working Paper 4105*, November 2000

<sup>41</sup> Von Hippel, *Democratizing Innovation*, pp. 22-35.

<sup>42</sup> Parsons and Rose, *Invisible on Everest*, pp.237-238.

<sup>43</sup> Interview of Tony Howard by Mike Parsons, 14 September 2001.

<sup>44</sup> Interview of Tony Howard by Mike Parsons, 14 September 2001.

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<sup>45</sup> Interview of Tony Howard by Mike Parsons, 14 September 2001.

<sup>46</sup> Terry Love began working for Troll at this time and this is a description of activities when he joined.

<sup>47</sup> Interview of Tony Howard by Mike Parsons, 14 September 2001

<sup>48</sup> *Mountain Ear* January 1992, 'Troll Safety Equipment' Report by Tony Lack.

<sup>49</sup> Chris Bonington, *Annapurna South Face* (Cassel and Co, 1971) p. 246.

<sup>50</sup> Parsons and Rose, *Invisible on Everest*, p. 235-236.