

# Diversifying into Technical Clothing Manufacture as Entrepreneurial Learning: A Situated Learning Theory Perspective

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## Abstract

**Purpose** - The purpose of this paper is to demonstrate analytically how entrepreneurial action as learning relating to diversifying into technical clothing – i.e. a high value manufacturing sector – can take place. This is particularly relevant to recent discussion and debate in academic and policy-making circles concerning the salvage of the clothing manufacture industry in developed industrialised countries.

**Design/methodology/approach** – Using situated learning theory (SLT) as the major analytical lens, this case study examines an episode of entrepreneurial action relating to diversification into a high-value manufacturing sector. It is considered on instrumentality grounds, revealing wider tendencies in the management of knowledge and capabilities requisite for effective entrepreneurial action of this kind.

**Findings** - Boundary events, brokers, boundary objects, membership structures and inclusive participation that addresses power asymmetries are found to be crucial organisational design elements enabling the development of inter- and intracommunal capacities. These together constitute a dynamic learning capability, which underpins entrepreneurial action, such as diversification into high-value manufacturing sectors.

**Research limitations/implications** - Future research should undertake a multiple-case study involving firms of different age, in different development stage, operating in contrasting sectors and should focus on the organisational design elements advanced in this paper and their interplay.

**Practical implications** - It is argued that optimising the function of these organisational design elements is pivotal in the development of the technological knowledge and capabilities required

for effective diversification into technical clothing in particular and high-value manufacturing more generally.

Originality/value – Through a refinement of SLT in the context of entrepreneurial action, the paper contributes to an advancement of a substantive theory of managing technological knowledge and capabilities for effective diversification into high-value manufacturing sectors.

Keywords – entrepreneurial action, entrepreneurial learning, high-value manufacturing, diversification, technological knowledge management, technological capabilities development, situated learning theory, communities of practice

Paper type – Research paper

## Introduction

The last two decades saw a dramatic increase in environmental dynamism and complexity, which morphed the competitive landscape for the majority of EU clothing manufacturers into a hostile territory. It has been a period characterised by a shift in power to large retailers, fierce competition from low-cost exporting Asian countries and increased environmental regulation. These forces combined, contributed to a dramatic contraction and restructuring of the industry, commensurate with a reconfiguration of supply chains (Baden, 2002; Totterdill et al., 2003; OECD, 2004; EC, 2010). Against this backdrop, despite the fact that clothing manufacture faces a severely harsh competitive landscape, an alternative vision is articulated where UK clothing manufacturers survive and prosper by embracing new technology and diversify into high value sectors, such as high performance/technical clothing (EMCC, 2004; OECD, 2004; Lane, 2006; EC, 2010). Yet, the clothing manufacture sector has been far from leading edge in management practice, workforce and organisational development found in other sectors (Totterdill et al., 2003). Therefore, the creation, circulation and evolution of technological knowledge relating to such entrepreneurial action - i.e. the undertaking of strategic change as diversification into high value clothing manufacture sectors via new product development - merits attention. Conceivably, such strategic change is central to the notion of entrepreneurship (Schumpeter, 1934) and is linked to innovation, competitive advantage and small-firm growth (e.g. Joyce and Woods, 2003; SBS, 2006, NESTA, 2010). In the context of manufacturing firms, such change is supported by a learning-based technology strategy which is dynamic (Grant et al., 1991) and “provides the environment in which the production technology being used and process

knowledge created can be inimitable, yielding superior competitiveness” (Ahmad and Schroeder, 2011, p. 20).

In the light of the above, the aim of this paper is to shed some light onto how entrepreneurial action enabling the successful diversification of clothing manufacturing into a high value, technical clothing sector – a strategy heavily promoted by enterprise policy in the UK and other Western developed economies - can be effected. Situated learning theory (SLT) (Brown and Duguid, 1991, 1998; 2000; Lave and Wenger, 1991; Wenger, 1998, 2000; Brown, 2004; Snyder and Wenger, 2010) is used as the main analytical lens to elucidate the development of technological knowledge and capabilities that underpin business growth through such entrepreneurial action. The rest of the paper is organised as follows. The next section provides the theoretical background, delineating SLT and its constituent elements. This is followed by a section outlining the research design of the study this paper draws upon. The ensuing section presents an exemplar and instrumental case study (Yin, 2003; Stake, 1995). The penultimate section discusses the findings of the study, followed by the final section, which concludes the paper and suggests avenues for further research.

## Theoretical Background

Entrepreneurial action entails creating new resources or combining existing resources in new ways to develop and commercialise new products, move into new markets/service new customers and/or introduce new organising processes (Sexton and Smilor, 1997; Hitt et al., 2001; Gartner et al., 2003). Growth-oriented small firms, the driving engine of economies across the world, are conceived of typifying entrepreneurial action, relating to identifying and exploiting successfully entrepreneurial opportunities (see for instance Davidsson et al., 2002). By default, such entrepreneurial action is integrally related to innovatory activity and learning (Schumpeter, 1934). The latter, in the context of manufacturing, purportedly should be underpinned by a technology strategy that places emphasis on the soft, people practices relating to managing technological knowledge (Gloet and Terziovski, 2004).

From a social constructionist/practice-based perspective, situated learning theory (SLT) offers a potent theoretical lens for enhancing understanding of entrepreneurial action relating to diversification into high-value added/technical clothing context, by examining the management of technology underpinning such entrepreneurial action on the platform of social, participative practice. The theory has been gaining momentum in organisational studies concerned with learning, knowledge and innovation during the last two decades, providing an alternative to conventional organisational learning approaches. The centrepiece of SLT is the notion of communities of practice (CoPs), which provides the embedding generative framework for the development of new knowledge, emphasising the need to understand learning and knowing related to innovation as social micro-processes (Brown and Duguid, 1991; Wenger, 1998; Brown and Duguid, 1998; Brown and Duguid, 2001; Tsoukas, 2002; Huysman, 2004; Tsoukas and Mylonopoulos, 2004; Snyder and Wenger, 2010). Hence, learning as change and innovation occurs through participation in social micro-processes related to practice, within communities of practice, where new meanings and identities are (re)created. The term ‘practice’ signifies a regular activity, such as work, especially at a profession.

Notwithstanding the recent calls for taking a practice-based approach to entrepreneurial learning (Rae and Carswell, 2001; Rae, 2004; Taylor and Thorpe, 2004; Thorpe et al., 2005), with the exception of a few studies (Theodorakopoulos et al., 2005; Hamilton, 2011; Theodorakopoulos and Figueira, 2012), SLT has not been used systematically to any length in this context. Our thesis is that it can enhance our understanding of how learning underpinning entrepreneurial action relating to diversification to technical products in small, growth-oriented, innovatory clothing manufacture firms is achieved. This entails how relevant technological knowledge is generated in shared spaces where multiple actors operate and how then it is internalised and used to develop new, high value, technical clothing products.

Situated learning theorists maintain that change, learning and innovation (or learning as change and innovation) takes place in the interface between members of interrelated CoPs (Brown and Duguid, 1998; Wenger, 2000; Swan et al., 2002; Wenger et al., 2002; Scarbrough et al., 2004; Snyder and Wenger, 2010). Constellations of interrelated CoPs form a ‘social learning system’ (Wenger, 2000) that produces an ‘ecology of knowledge’ (Brown and Duguid, 1998).

Employees, beyond being members of their organisational CoP, they also belong to other broader CoPs, owing to their professional networks and specialisation (Brown and Duguid, 2001; Swan et al., 2002). For instance, knowledge workers of technical clothing manufacture firms, possess specialist skills and knowledge to variant types and degrees, which gives them access to their wider 'professional' CoPs, beyond their organisation. Connected in this way, these boundary spanners "can rely on a complex system of overlapping communities, common backgrounds, and personal relationships to help evaluate and propagate knowledge" (Brown and Duguid, 1998, p. 102). Hence, knowledge generated inter-organisationally, i.e. in the wider, professional CoP, can be transferred into the organisation and vice versa.

However, whilst knowledge may flow to members of a professional CoP that span organisations, exhibiting 'leakiness', it may not flow within the organisation amongst members of different CoPs, with different epistemic principles, showing simultaneously 'stickiness' (Brown and Duguid, 1998, 2001). Therefore, building a strong organisational CoP and creating cohesion between employees belonging to different professional CoPs becomes important for enabling inflows and deterring outflows of knowledge. Whilst it is difficult to achieve this in large organisations due to specialisation of knowledge and expertise resulting from division of labour, the small firm offers a fertile ground. The small firm is typically characterised by a flexible and multitasking workforce, where employees have a better understanding of each other's work, oftentimes having to perform various functions, in different areas.

The components highlighted by Brown and Duguid (1998) and Wenger (1998, 2000) form the crux of the conceptualisation used to address entrepreneurial action in new product development and diversification into technical clothing as learning. It is submitted that a CoP can be assessed on three dimensions: its quality (higher learning energy), its boundary experiences (i.e. more generative interfaces with other organisational or professional CoPs ) and the identity of those belonging to a CoP (e.g. identities become more receptive to new ideas and possibilities). In turn, the stronger a CoP, the more productive its boundaries and the healthier its identities, the higher its ability to create new meaning and innovate. That is, an organisation as a potent CoP is more capable of taking entrepreneurial action, for instance, identifying and exploiting entrepreneurial opportunities relating to diversification into high value, technical clothing. Put another way, this perspective focuses mainly on three major dimensions that shape the

functioning of CoPs according to Scarso and Bolisani (2007), namely the organisational dimension, the cognitive dimension and the economic dimension, from a social participation perspective.

With regard to building a potent organisational CoP to underpin learning and innovation (manifested in entrepreneurial action), Wenger (1998, p. 22) argues that ‘if learning occurs naturally then what is needed is not to create learning, but rather to create the circumstances that make learning empowering and productive’. In this respect, organising for learning pertaining to entrepreneurial action in the context of diversification into technical clothing, alludes to considering the factors that can enhance communal learning. Prescriptive recommendations bring to fore concepts such as boundary events, brokers, boundary objects, membership structures and inclusive participation as crucial for nurturing CoPs and learning within them (Lesser and Everest, 2001; Wenger, 1998; 2000; Wenger et al., 2002; Plaskoff, 2003; Snyder and Wenger, 2010).

However, it is noteworthy that although such prescriptive approaches provide a compass useful for practitioners, such popularised versions of SLT have been criticised as dimly recognizing the idea that learning practices are shaped, enabled and constrained by relations of power. According to such critics (e.g. Fox, 2000; Contu and Willmott 2000, 2003; Marshall and Rollinson, 2004) ‘Situated learning’ and the concept of CoPs has been promoted within a managerialist/functionalist remit as a medium or even as a technology of consensus and stability. The original conceptualisation of learning situated in CoPs has selectively appropriated notions to serve a managerialist mindset; radical, key elements relating to power relations and political activity have been marginalised or entirely disregarded. Put another way, there is a marked shift from earlier participation in an analytic community engaged in practices related to enhancing understanding for emancipation purposes to an analytic community concerned with prediction and control for improving performance. Therefore, it is postulated that a more central consideration of power is needed to extend the contribution of SLT. Applying SLT as the major analytical lens without paying due regard to critical issues relating to power relations and political activity can obscure elements that may be pivotal in enhancing understanding of the learning processes underlying entrepreneurial action relating to diversification into technical

products in growth-oriented, small clothing manufacture firms. The next section outlines the research design of the study this chapter is based upon.

## Research Approach

The empirical part of the paper grounds SLT on a longitudinal case study. This entails a small, clothing manufacture firm, which managed to successfully diversify into technical clothing. The latter constitutes a new economy, growing sector, representative of high knowledge-content products. As mentioned earlier, clothing manufacture firms in Western developed countries are advised to diversify into higher-value manufacturing and move into high-knowledge content sectors, such as high-end fashion design or performance clothing/technical clothing. Therefore, this kind of knowledge-based clothing manufacture firms are often considered as model firms with regard to entrepreneurial behaviour and knowledge creation for firms in other industries. In the same line, logic suggests that such firms afford better opportunities to gain insight into the dynamics of organising to learn than those by traditional firms. Hence, the case-firm examined in this study is purposively selected on theoretical grounds, typifying this kind of firms. Put another way, Beta-Clothing (a pseudonym to preserve anonymity) is a case study that serves as an exemplar, aiming at analytical generalisation to theory - i.e. not statistical generalisation (Yin, 2003). Arguably, Beta-Clothing, as a successfully diversified, growth-oriented, innovatory small clothing manufacture firm constitutes an exemplar, instrumental case (Yin, 2003; Stake, 1995).

Rapport with the firm was developed over eight months, involving in-depth personal interviews with key decision makers/key agents, knowledgeable of growth-related entrepreneurial action. These key informants had experienced directly and contributed significantly to entrepreneurial growth attributable to new product development, in different capacities; from process manager, to technical assistant, to project manager, to Sales Manager, to Managing Director. During the interviews participants discussed a learning episode of entrepreneurial action relating to entering the ballistics protection market – a technical clothing sector - in detail. In this undertaking, learning is seen as involving both cognitive change and action in accord with Vera and Crossan (2004). The learning episode technique employed in this study is a variation of the ‘critical

incident' or 'critical event method', which has been applied to entrepreneurship studies (Deakins and Freel, 1998; Cope and Watts, 2000; Cope, 2003; Zhang et al., 2006). Focus was on processes that supported Beta-Clothing's entrepreneurial action relating to developing new products for a new market. This took place over a period of eight months approximately and contributed significantly to the growth of the company. The interviews aimed at encouraging the participants to expand on the process that led to the episode, what caused it, how it was resolved, who was involved in that process, what was learnt, how and when. The purpose was to obtain an insight on how issues evolved over time and where and how technological knowledge and capabilities were developed, integrated and used in order to understand how the process of entrepreneurial action was effected.

Formal interviews were supplemented by extensive informal discussions during lunch breaks and casual encounters outside the premises of Beta-Clothing, non-participant observation and examination of relevant documentation and archival data, where available. Concerted efforts were made to triangulate sources to address the problems associated with retrospection, mainly lapses in memory and ex post rationalisation (Easterby-Smith et al., 2002). Importantly, in accord with Weick (2002), it is maintained that studying the phenomenon retrospectively provided the opportunity to capture the respondents' reflection on what happened during this episode of entrepreneurial action not as an isolated incident, but as an indicator of wider tendencies (Cope and Watts, 2000; Cope, 2003) in organising for entrepreneurial action in the context of diversification into technical clothing. The Miles and Huberman's (1994) general analytic procedure was followed. This supported an extension logic (Yin, 2003). The QSR NVivo software was used to code and retrieve, which proved quite useful in handling large volumes of data and managing complexity. Notably, the package was also useful in linking ideas, exploring patterns and in creating an audit trail/case-study database so that the findings are trustworthy (Yin, 2003).

## Beta-Clothing as an Instrumental Case

### Operating environment

The Clothing Manufacture industry constitutes a diverse and heterogeneous arrangement, comprising the manufacture of a wide variety semi-finished and finished products. It is still a significant part of the manufacturing sector of the UK economy; providing jobs in areas of otherwise high unemployment (Key Note, 2010). Clothing manufacturers are concentrated in particular regions, contributing to their wealth and cultural heritage. The contribution of the clothing industry employment in East Midlands, London, North West and Scotland is still considerable, despite the marked decline. Its importance for social and economic cohesion is amplified by the fact that the sector is dominated by a large number of SMEs. Being one of the oldest in the history of industrial development, the clothing industry is often referred to as a 'traditional industry'; an 'old economy sector', as large parts of the production process have remained labour intensive (OECD, 2004). Contextual forces – markedly technological developments, liberalisation and globalisation - have had a profound impact on the industry.

The last two decades saw a dramatic increase in environmental dynamism and complexity, shaping the competitive landscape for the majority of EU clothing manufacturers into a hostile territory. It has been a period characterised by a shift in power to large retailers and fierce competition and increased environmental regulation, resulting in dramatic contraction and restructuring of the industry (Baden, 2002; Totterdill et al., 2003; OECD, 2004; EC, 2010). With the phasing out of the Multi-Fibre Arrangement (MFA), globalisation and on-going liberalisation had and continue to have a profound impact on the clothing sector. High import penetration from large low-cost exporting Asian countries such as China, India and Pakistan, which are no longer confined by quantitative restrictions and 'anti-dumping' quotas, constitutes one of the most significant influences on the clothing manufacture sector. Import penetration has grown most significantly from a low base in the 1960s and 1970s to 56% in 1998 to over 90% of the total market by the end of 2000's, relating primarily to standardised products with predictable seasonal demand levels (Key Note, 2010). Notably, growth of global sourcing and outward process transactions (OPT) has been stimulated by a change in retail strategy. The changes in the procurement policy of large retailers resulted in the reduction of their UK manufacturing base (Dicken, 2003; Totterdill, et al., 2003). Factory closures and rationalisation across the UK, throughout the 1990s and more markedly during the first half of the 2000s, has been the

dominant trend in the sector. Manufacturers, in response to a relentlessly intensifying competition, price deflation and declining sales and profitability had to transfer production to low-cost producer countries, with tremendous knock-on effects in their supply chains and domestic investment ONS (2006).

Against this backdrop, the competitive advantage of Western developed economies' clothing sector in general and UK clothing sector in particular, largely depends upon exploitation of new emerging technologies, new materials, innovation and skills (EMCC, 2004, OECD, 2004, EC, 2010). New performance uses for sports and 'smart' functions such as thermal insulation and capability to adapt to environmental conditions, as well as protective clothing for defence purposes, present great opportunities for diversified manufacturers (Totterdill et al., 2003, EMDA, 2008). Hence, despite fears that the UK clothing industry faces near-certain devastation, an alternative vision is articulated where, where the UK clothing manufacturers embrace new technology and the flexibility to respond to demand for technical clothing. As the demand for differentiation increases even further, UK manufacturers exhibit innovation in the design and flexible production of new, knowledge-content products. Under this scenario, well diversified high-value technical clothing manufacturers survive and prosper (EMCC, 2004; OECD, 2004; Lane, 2006; EC, 2010). However, the clothing sector has been far from leading edge in management practice, workforce and organisational development found in other sectors (Totterdill et al., 2003; EC, 2010) and therefore such transition, although desirable, may not be easy. The following sections deal with how Beta-Clothing managed to diversify successfully into technical clothing – more specifically in the ballistic protection market. An analytic description of the case-firm's internal context is followed by a discussion of the key technological learning elements underpinning entrepreneurial action relating to Beta-Clothing's diversification efforts, drawing on broader tendencies.

### Internal Context

Beta-Clothing Ltd is a small Clothing Manufacture based in the Midlands of England. It was founded in 1995 and, currently employs 96 full-time workers. It manufactures and supplies a wide range of regular as well as technically advanced, high performance garments and ballistic

armour protection articles. It is managed by four Directors, who own an equal share in the business. Clive, Ken, George and John head the four functions around which Beta-Clothing has been structured: UK Sales, Exports Sales, Production and Finance respectively, with John being the Managing Director. The company currently has two divisions. Its clothing division produces articles to various specifications and styles. Its technical garments are made to be moisture and wind proof, thermally efficient, light and heat resistant, flame retardant, breathable and compatible with body armour. Its second division, Armour and Ballistic Protection, is a relatively new development. Since 2004 it supplies a range of armoured vests and jackets for law enforcement and military personnel, as well as for civilian staff operating in hostile environments, such as media correspondents, security guards and bodyguards who can be exposed to very high and diverse threats. Beta-Clothing supplies a wide range of performance and protection clothing to military organisations, law enforcement agencies, emergency services and large corporate organisations. Its UK customers include the MoD, the Police, the Royal Mail, airlines and utilities, as well as retailers, wholesalers and distributors. Its products are exported to the USA, countries of the EU, Scandinavia, Middle East and Far East with 40% of its turnover coming from exports to 30 countries.

Knowledge in Beta-Clothing can be broadly divided into three genres: market specific, production/technology specific and administration/finance specific knowledge. The relatively flat structure of the firm reflects this division in practice and knowledge and enables communication between members of the four main functions, sales being more market oriented and production more technology focused. Being a smaller organisation, there is a greater overlap between the four main functions/sub-CoPs, and the people who deal with each cognate area have a fairly good understanding of the others. Beta-Clothing's respondents maintained that its competitive advantage is based on a focused differentiation strategy (Porter, 1985); catering for the corporate and Armed Forces markets by offering a comprehensive range of products including technical clothing and body armour. Echoing Bowonder and Miyake (2000), technology strategy is seen as a process of aligning knowledge search, knowledge envisioning, creation and evolution with a view to meeting changing customer needs and future technology trajectory. The competences and skills underpinning technology strategy are embedded within systems and routines characterising social practice in the organisation (Tsoukas 2002; Tsoukas

and Mylonopoulos, 2004). Discussing practice in Beta-Clothing, Clive commented on the importance of the knowledge and skills embodied in the living experience of workers in this way:

“Core strength is the people...The experience they have is our strength as an organisation which shows in our people. They have been in the game for so long, they know the supply base, they know the way we operate, they know the systems, they know the products, what it takes to meet the [technical] standards, what customers want, what to find and where... what would work in new product development ... the sort of thing you learn by doing the actual work and talking to people around you...inside and also outside the business, in the industry, you know...” (Clive, Sales Director)

Entrepreneurial Action as Diversification into High Value added/Technical Clothing

Key Learning Episode – Diversifying into the Ballistic Protection Clothing Market

Having set out the internal context, the following section discusses entrepreneurial action in Beta-Clothing against a significant learning episode. This concerns the establishment of the Armour and Ballistic Protection division in 2004 and signals Beta-Clothing’s entry into a new, promising market of higher knowledge-content/higher added value products. Entering this market was an effort to enhance the technical products part of the business, differentiating Beta-Clothing’s competitive position and hedging against an increasingly hostile environment. Creating the Armour and Ballistic Protection Division meant that Beta-Clothing had to expand its technological knowledge-base and obtain expertise in a particularly specialised area.

All of Beta-Clothing’s armoured jackets and vests incorporate high performance heat and sweat management linings. The production of such knowledge content clothing had implications for the skills base needed to compete effectively in this market and signifies the company’s new strategic direction. All respondents commented on the strategic significance of manufacturing body armour. The establishment of the Armour and Ballistic Protection Division enables Beta-clothing to differentiate its position by specialising in a niche market where price is not the prime purchasing criterion and profit margins are high. Illustrative is the way John elaborated on this point:

“So, we are providing body armour and I see that as the future for the company. I see turnover in the clothing sector falling in future – you can’t compete with the Far East on price. That’s why

we have introduced the body armour because that is going to develop over the next years. The game is different; expertise, quality and speed matters and you don't have to sell so many items to achieve the same turnover. It has a high average value...I see that as one of the most important things happened in the life of the business.” (John, Managing Director)

The episode marks significant changes in Beta-Clothing's value chain (Porter, 1985) that the firm underwent in order to generate dynamic capabilities to compete effectively and cope with the challenges stemming from the external environment. It is considered as indicative of broader tendencies in entrepreneurial action.

### Entrepreneurial Action Enabled by Learning within Communities of Practice

#### Developing New Meaning and Identity in Boundary Interactions

With regard to identifying entrepreneurial opportunities, as the episode of entering the ballistic protection niche market illustrates, the interaction between boundary spanners of interrelated CoPs (e.g. Wenger, 1998) holds centre stage. Arguably, clothing manufacturers, textile suppliers, corporate and military purchasers and expert advisors constitute a constellation of interrelated CoPs which form a social learning system (Wenger, 2000) and provide ecologies of knowledge (Brown and Duguid, 1998). Moreover, employees of such firms belong to other broader CoPs owing to their specialisation. For instance, workers of clothing manufacturers with special interests, such as sales people, designers and technologists, beyond being a part of their organisational CoPs they also belong to a broader 'professional' network, which produce its own social practices, identity and 'epistemic culture' (Brown and Duguid, 2001; Swan et al., 2002). There is a sufficient degree of convergence on valued activities, norms and professional identities, interpretative frames and heuristics that characterises such networks or 'social practices' (Wenger, 1998, 2000; Snyder and Wenger, 2010), which cut across departments and organisations.

Trade shows and workshops contribute to overcoming divisions in practice and generating significant interaction that may lead to the identification of entrepreneurial opportunities and

relevant learning (Scarborough et al., 2004). The respondents of Beta-Clothing explained that such boundary events are instrumental in acquiring valuable information/knowledge not only on technological developments but also on wider areas of their business. Knowledge generated through participating in such events eventually led to entrepreneurial action as the episode concerned indicates. During a discussion on how knowledge related to entrepreneurial opportunities is generated in Beta-Clothing, Clive commented on the significance of such events and the importance of forming new ideas and meaning through participation in such boundary interactions. Beta-Clothing's decision to enter the ballistic production market in 2004 was influenced by information and knowledge acquired initially by participating in such events:

“We felt that body armour was something that was going to become more and more important...it is going to be very much a growing market...We could see that there is demand for these products. It was certainly coming up in the shows and face-to-face meetings with customers and we could see the way discussions in these events organised by the Defence Manufacturers Association, in trade that our customers are moving. And we knew that we could offer a good product to them.” (Clive, Sales Director)

Participation in boundary processes involving interaction with boundary spanners of various organisations, such as salespeople of organisations like Beta-Clothing and corporate buyers who belong to this social learning system often afford the engaging parties with new information and knowledge at a technical and business level (Wenger, 2000; Wenger et al., 2002). It has to be noted that interactions between the various boundary spanners of organisations participating in such events, including buyers and suppliers are quite informal, which underscores the social nature of information and knowledge (Brown and Duguid, 2000). However, the significance of this informality in envisioning, creating and evolving knowledge is acknowledged in managing technological knowledge for entrepreneurial action in Beta-Clothing. On this point Clive maintained:

“It's all informal. The seminars and especially the trade shows are quite important events for getting information and making sense of it. By talking to people there like manufacturers, buyers, advisers, we tend to find out what is happening in the market. Sometimes we identify the right contact or come up with new ideas but like I said it's mainly informal, casual conversations; having said that people here are encouraged to...” (Clive, Sales Director)

Boundary Objects

It has to be noted that boundary encounters promoting the circulation of tacit knowledge support and complement other sources of information and codified knowledge about the market, such as trade magazines and web pages which add to the connectivity of the constellation of CoPs (Wenger, 2000) comprising the uniform/corporatewear and protective clothing sectors. Artifacts displayed in such sources facilitate the imagination and alignment of these communities (for instance over utility, styles and technical characteristics), which raises awareness of the repertoire of methods and standards (Star and Griesemer, 1989; Star, 1995). Most importantly, such boundary objects contribute to an interpretative framework for the identification and exploitation of entrepreneurial opportunities George commented on the heuristic value of these sources in this way:

“We look at the trade magazines and websites of competitors and the industry in general – I’m talking about workwear and uniforms – and we try and see what’s new, if there are any new developments, any new trends or technical stuff that has to do with certification, or even invitations for tenders. Sometimes by looking at magazines and websites we come up with ideas for developing new products or target new customers...Then we may explore that further in workshops or tradeshows.” (George, Production Director)

#### Ballistics Experts as Powerful Knowledge Brokers

With regard to the second episode – entry in the ballistic protection sector - of particular importance is a specific group of opinion leaders in the industry who act as advisors to the MoD. These are experts in ballistics who have knowledge of the customers’ needs. Conceivably, their trajectories facilitate engagement with interrelated epistemic communities (Brown and Duguid, 2001) encompassing technical clothing manufacturers like Beta-Clothing and corporate/Armed Forces purchasers. These trajectories proffer identity-forming experiences that foster sensemaking of what technology and solutions are available to tackle demand for a given product category. Due to their status, they are close enough to connect strongly with the customer organisation and have an influence on its buying behaviour, yet far enough to gain from new experiences that participation in a variety of contexts affords (Brown and Duguid, 1998).

Arguably, their trajectories in the field promote the connectedness, expansiveness and effectiveness of their identity, which help them act as brokers (Wenger, 1998, 2000) or translators (Brown and Duguid, 1998) credibly. Indicative is the account provided by George on the identification and exploitation of the opportunity to provide ballistic protection products in the second learning episode. The consultant that Beta-Clothing employed to develop ballistic protection products and obtain the requisite certification was someone who was well known in the CoP of ballistic protection manufacturers. Having worked for different manufacturers and also as an advisor to the MoD in the past he was able to see how Beta-Clothing could best address the Armed Forces' needs for ballistic protection. Clive elaborated on this point:

“We got someone else on board at that time to take responsibility for that, because we had no experience or knowledge at all of body armour. This person had the scientific knowledge and experience required because he has been involved in the industry for a number of years and he is a consultant, he is a consultant to the MoD. He is a forensic scientist, a ballistic scientist. I had never met him, never spoken to him, but I knew that by reputation he was the person to take us forward. His name pops up with other body armour manufacturers, with customers, he was known in the industry. He was giving presentations, he was on the lecture circuit...Our technical consultant is actually a Home Office advisor to the Police. He sits on the NATO Committee for ballistic protection and so beyond the technical knowledge, technical skills he understands the customers, and so the MoD and the corporates listen to people like him. He knows where the customer is coming from, their needs, their concerns etc. and so he draws our attention to how we should go about developing and marketing these products.” (Clive, Sales Director)

It has to be noted that power relations (Blackler and McDonald, 2000; Fox, 2000; Contu and Willmott, 2000, 2003) are inherent in the intercommunal social structure between advisors and boundary spanners of manufacturers of ballistic protection products such as Beta-Clothing. They appear to play a significant role in gaining access to government and military procurement systems. Advisors to the customers are opinion leaders who can restrict legitimate participation to and learning in such supply chains. George elaborated on this point:

“Our ballistic protection clothing has been developed in consultation with someone who advises the MoD - he is one of them. That helps because the advisors have the power to influence their decision. The buyer has to take into account their opinion about body armour or whatever before he makes a decision. And as they say people buy from people. Of course you have to have a good product, but it doesn't help much being on the wrong side. If the advisor for some reason is not fond of a given supplier, then it's a problem for that firm...He may like or dislike a supplier because of something that has happened in the past or just because he wants to be in line with the other advisors, he doesn't want to go against the flow, it depends really. The problem is

if you are cut out you don't get the chance to learn what is required and develop.” (George, Production Director)

### Establishing Meaning in Intraorganisational Social Interaction

Although arguably different functions, such as sales and production make up sub-communities within Beta-Clothing, their identities connect through engaging with each other, imagining (i.e. having a good understanding) of respective practices and aligning their activities with broader purposes (Wenger, 1998, 2000). Information and knowledge related to the exploration and exploitation of entrepreneurial opportunities identified at an individual or group level are then disseminated in Beta-Clothing. New meaning is particularly shared with the ‘dominant coalition’ (i.e. the core team of the four Directors) and key workers responsible for sales and production - to obtain feedback and ideas that can enhance sensemaking and refine/modify meaning. Ultimately, decision-making rests with the ‘dominant coalition’. In the final analysis, entrepreneurial action related to the identification and exploitation of opportunities to enter the ballistic protection sector appears to be the culmination of informal dialogical processes and social interaction (Wenger, 1998; Brown and Duguid, 2000, 2001; Orlikowski, 2002; Wenger et al., 2002). Such activities involve the ‘dominant coalition’ as well as other key boundary spanners, such as salespeople, technologists and ballistics experts that together negotiate new meanings related to market and manufacturing technology requirements. Discussions with the respondents on the learning episode revealed that collective sensemaking and learning at the core team/organisational level, related to identifying and exploiting entrepreneurial opportunities, is taking place in informal social interaction, which is integral to Beta-Clothing’s communal praxis (ibid). Notably, negotiation of new meanings requisite for identifying and exploiting such opportunities is facilitated by the fact that workers share office space, have lunch together at the cafeteria, or take coffee at the main corridor during the course of the working day. This is part and parcel of a learning-based technology strategy, which provides such a conducive environment where employees can share, suggest, and experiment with their ideas, leading to enhanced competitiveness (Liu and Barrar, 2009; Ahmad and Schroeder, 2011). Departing from the diversification episode in question, Clive elaborated upon this point:

“We work in such close proximity that [dialogue] is happening all the time. Often we have a coffee together, we visit each other, it’s actually difficult not to interface; we are together all the time. We also have formal meetings, which are minuted; board meetings are once a month, production planning meetings once a week and we have product development meetings. A lot of people are involved in development because you’ve got procurement and purchasing, sample development, sales and production; about every 3 months. But we are communicating informally all the time. Workstation location is very important. Fact is, although we don’t have an open plan office as such here, simply because of the layout of the building, we do work in teams together and all conversations can be overheard, we all know what’s going on, which means that people can pick up the threads. New ideas are discussed and debated so that everyone knows what’s happening in the business and can contribute.” (Clive, UK Sales Director)

### Power Relations and Political Activity

Although, in principle, workers’ negotiability of meaning related to technology and market issues concerning entrepreneurial action appears to be limited, ‘knowledge workers’ such as graduate technologists and ballistics experts tend to be more influential. By virtue of their specialist knowledge, their input in strategy making and technology management is solicited and taken into account by the ‘dominant coalition’. Commenting on Beta-Clothing’s effort to enhance its learning capabilities in order to diversify to technical products and differentiate its position in the marketplace, Clive elaborated on the importance of including graduates in the decision making process:

“So, we got to try and make sure that the flow of enthusiasm and knowledge is the right way...we are going to keep her up here and have her [the graduate] as part of this team [management team]. We don’t want her to go into the factory and away from the sphere of influence.” (Clive, Sales Director)

The ‘dominant coalition’s’ approach to legitimising the peripheral participation (Lave and Wenger, 1991) of neophyte graduates in processes related to technology management underpinning business strategy facilitates their mobility towards the core of Beta-Clothing’s organisational CoP. This helps them attain identities of mastery and contributes to the development of Beta-Clothing’s learning capabilities, which in turn confer dynamic capabilities requisite for entrepreneurial action. Although learning is often deliberate and consciously pursued amongst the members of the ‘dominant coalition’, John’s account indicates that Beta-Clothing’s CoP may not always be a unitary whole, but a ‘loose’ coming together of members

with variant interests and agendas. Antagonistic relations between newcomers and more experienced members, "...arising from the wider situatedness of work organizations within politico-economic contexts" can impede the creation of meaning and learning (Contu and Willmott, 2000, p. 272). In the past, other neophytes that pushed for changes in work organisation that shifts the balance of power have been met with suspicion by certain oldtimers, who tried to resist change in the organisation.

In the past, political intrigues and power configuration in Beta-Clothing's CoP kept these new members in Beta Clothing's CoP in marginal positions, pushing them back into identities of non-participation (Contu and Willmott, 2000, 2003). Consequently, opportunities for innovative input and learning were missed. This is at odds with organisational values that foster organisational learning, such as commitment to learning, open-mindedness and shared purpose (Morgan and Turnell, 2003). It can potentially undermine the cohesiveness and mutuality of the organisational CoP and restrict the expansiveness and effectiveness of its communal identity (Wenger, 1998, 2000, Wenger et al., 2000; Brown, 2004; Snyder and Wenger, 2010). In turn, when participation of new comers is restricted and the currency of their new meanings and insights related to technology underpinning entrepreneurial action is dismissed on political grounds, the community's sensemaking and learning capability requisite for effective entrepreneurial action are undermined. Crucially, core competencies of a firm can turn into core rigidities (Leonard-Burton, 1995). John elaborated on this point in this way:

"In the past, new employees with skills and ideas had faced resistance from certain people here that opposed changes, playing politics. These were valued employees, legacy of the old business with experience – they knew the business inside out and we couldn't just get rid of – all now gone, retired. But the point is that when you have power struggles and politics, surprisingly so because we are a relatively small business, it's not good. Because new ideas are blocked and people feel alienated and, at the end of the day, we miss opportunities. This is something that we are aware of and we are making every effort to encourage people to put forward new thinking and curb resistance." (John, Managing Director)

Hence, Beta-Clothing makes concerted efforts to widen participation and optimise learning processes relating to markets and technology, which underpin entrepreneurial action, as the above quote illustrates. The next section concludes the paper and suggests avenues for future research.

## Conclusion

UK manufacturers operating in the clothing industry have seen an increasingly complex, dynamic and ultimately hostile operating environment, especially over the last two decades. The main challenges they face relate to high import penetration from low-cost producers, skills shortages, as well as short, fast and flexible production cycles, determined by large customers and generally the nature of the markets they serve. In the final analysis, fitting their customers' supply chains requires capabilities relating to quality, speed, dependability, flexibility, and cost of manufacturing. Against this backdrop, Beta-Clothing was considered as an exemplar (Yin, 2003) or instrumental (Stake, 1995) case. Beta-Clothing underwent a major learning episode of diversification into high-value manufacturing sector, by developing new technical clothing products, in order to gain competitive advantage and address effectively challenges stemming from its operating environment. Notably, this episode was scrutinised, revealing wider tendencies in generating, internalising and using the market and technological knowledge required to effect entrepreneurial action of this kind. That is to say, these tendencies transcend the particular episode and relate to entrepreneurial action and learning indicatively.

Employing SLT as the major analytical lens, from the study of Beta-Clothing as an instrumental case (Stake, 1995), i.e. not as a sample of one, it is evident that the learning mechanism underlying entrepreneurial action is enabled by key actors' legitimate social participation at intra- and interorganisational/intercommunal levels. Technological knowledge and capabilities underpinning entrepreneurial action are inextricably linked with social participation in a web of learning systems and ecologies of knowledge (Brown and Duguid, 1998; Bowonder and Miyake, 2000; Brown and Duguid, 2001). Importantly, the ability to effect entrepreneurial action and diversity into high-value manufacturing hinges on displaying a learning capability defined in social communities (Wenger, 1998, 2000; Wenger et al., 2002). It is an outcome of a process of contextual learning, where social and intuitive understanding of problems, needs and solutions is developed through situated immersion and social participation in industry or other community networks (Rae, 2004; Taylor and Thorpe, 2004). Such a learning capability would appear to be a

function of the intra- and intercommunal capacities of the organisation. The term 'intercommunal capacity' relates to the competency to gather information and create market and technological knowledge pertinent to the identification and exploitation of entrepreneurial opportunities through interaction with other organisations/CoPs. Conversely, 'intracommunal capacity' refers to the competency to absorb, develop, operationalise and institutionalise such knowledge within the organisational CoP. Intra- and intercommunal capacities confer a learning capability, which can be classed as dynamic in its own right, and support technology strategy (Davenport et al., 2003).

Application and refinement of SLT in the context of entrepreneurial action contributes to a better understanding of the learning mechanism underlying the management of requisite technological knowledge and capabilities. Hence, the paper contributes to an advancement of a substantive theory of managing technological knowledge for entrepreneurial action as learning. Boundary events, brokers, boundary objects, membership structures and inclusive participation that addresses power asymmetries are all highlighted as crucial organisational design elements enabling the development of inter- and intracommunal capacities, which underpin entrepreneurial action. It is argued that optimising the function of these elements is instrumental in the development of the technological knowledge and capabilities required for effective diversification into technical clothing in particular and high-value manufacturing more generally.

The paper has implications for clothing manufacturers wishing to diversify to knowledge-content/high value-added/technical clothing, as well for business support providers concerned with the strategic development of such firms. From the perspective put forward, practitioners should centre their efforts on building their intra- and intercommunal capacities, which condition the situated learning underlying entrepreneurial action and, ultimately, organisational performance. Notwithstanding the value of this instrumental case-study in identifying wider tendencies and drawing lessons, future multiple-case study would address delimitations concerns. Such research should be conducted in a variety of settings, of differing environmental dynamism and complexity. Drawing on Eisenhardt and Graebner (2007), we call for multiple-case research involving firms of different age, in different development stage, operating in

contrasting sectors, focusing on the organisational design elements advanced in this paper and their interplay.

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