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Huaccho Huatuco, L, Martinez, V, Burgess, TF et al. (1 more author) (2019) High value manufacturing (HVM) in the UK: case studies and focus group insights. *Production Planning and Control*, 30 (1). pp. 60-75. ISSN 0953-7287

<https://doi.org/10.1080/09537287.2018.1524162>

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High Value Manufacturing (HVM) in the UK: Case studies and focus group insights

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This paper studies the internal mechanisms that allow organisations to become High Value Manufacturing (HVM). Using a qualitative methodology, three UK manufacturing companies formed in-depth case studies with semi-structured interviews, observations and historical data. The HVM value matrix of Martinez and co-workers is used to categorise each organisation's value proposition. Wider benchmarking of the three organisations was carried out against a focus group with an additional seven manufacturing organisations. Thus, data from ten manufacturing organisations are included in this research. The cases follow the "customer intimacy" HVM discipline. The business processes supporting these value propositions were identified. Interestingly, each organisation's desired value proposition differs from their current one. "Technological integrators" predominantly rely on New Product Development (NPD) and Strategy processes, whereas "Socialisers" rely predominantly on Strategy and Customer Relationship processes. Companies can use the findings to better understand their current HVM value proposition and, where necessary, plan their transition to a future desired HVM value proposition.

Keywords: Value proposition; High Value Manufacturing; business processes; manufacturing; strategic choice theory.

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1. Introduction

According to Innovate UK (2017: 29): “*The UK is the ninth largest producer in the world and accounts for 3% of global manufacturing output. Manufacturing is worth £162 billion to the UK economy. Improving UK productivity could add £30 billion to the economy by 2025 and create 500,000 new jobs*”. However, commentators see various challenges to UK manufacturing including current megatrends, such as: sustainability, ageing population, increasing global competition, e.g. Brazil, Russia, India and China (BRIC countries), the need to redesign Supply Chains of UK Small and Medium Enterprises (SMEs), and the implied adjustments to trading relationships arising from Britain’s exit from the EU (Brexit). High Value Manufacturing (HVM) is one way of meeting these challenges and the UK Government has prioritised relevant research investment.

Since the call for “moving up the value chain” (Porter and Ketels, 2003), the managers of UK manufacturing organisations have struggled to understand what this means for their companies (MacBryde et al., 2009, 2010). They could interpret this call as any, or all, of the following actions: (i) to extend their product offerings and wrap them up with inimitable services, (ii) to develop the key capabilities and technological know-how within their organisation and outsource all non-value adding activities, and (iii) to scan the horizon for other opportunities to gain competitive advantage.

This paper aims to explore the internal mechanisms that allow manufacturing organisations to become High Value Manufacturers by examining the alignment between the key competences, main competitive advantage and operational performance; and by ascertaining the characteristics of HVM organisations in practice.

We take as our definition of HVM the one given by Martinez et al. (2008: 5): “HVM firms do not compete primarily on cost. Instead they deliver value for one or

more of their stakeholder groups by contracting for capability, delivering product/service innovation, establishing process excellence, achieving high brand recognition and/or contributing to a sustainable society”. This broad definition does not exclude low-technology companies as HVMs. So, the main objective of HVM is to enhance the competitive advantage of manufacturing organisations in advanced economies by ensuring the alignment between their strategic intent and operational capabilities. This can be achieved by strategies such as: differentiation or sustainable increased profits / gain market share (Innovate UK, 2017).

This qualitative paper draws from three in-depth case studies and a focus group of practitioners. Qualitative research is deemed suitable since HVM is an emerging phenomenon which is better explored in its natural settings (MacBryde et al., 2013). A novel contribution is that rather than assume HVM as a discrete characteristic, we assume high-performing manufacturing organisations can be positioned on a spectrum of HVM capability. Previous work containing quantified theoretical footprints and some results of preliminary case study research (Huaccho Huatuco et al., 2011, 2014, 2016) is extended in this paper. This research builds on the definition of a footprint: “the genetic configuration of the value propositions” (see Martinez, 2003: 170) by interpreting a theoretical footprint as a statement of the expected scores against the six dimensions for each of the six value propositions.

In terms of practical implications, this paper’s findings can be used by manufacturing managers to better understand three aspects. First, their firm’s level of alignment between the key competences, main competitive advantage and operational performance. Second, what their current HVM proposition is. Third, to better plan their company’s transition to a future HVM proposition, where this is desired.

The following research questions are addressed in this paper: (i) To what extent does the alignment between key competence, competitive priorities and operational performance lead to HVM? and (ii) What are the characteristics of HVM organisations in practice?

The remainder of this paper is organized as follows. Section 2 reviews the related literature covering the topics of value, HVM, servitization and product-service systems (PSS), i.e. the intertwined package of product and service that the customer gets when purchasing a product. Section 3 outlines the study methodology, i.e. case and focus group. Section 4 presents the results of the three in-depth case studies and the focus group. Section 5 discusses the findings. Finally, Section 6 concludes the paper with some implications for theory and practice, as well as outlining limitations and future research avenues.

2. Theoretical background

This research uses the Strategic Orientation Choice theory (Child, 1972). In a nut-shell this states that decision-makers choose the way they structure their internal processes and how they measure performance to maximise the externally-perceived value of their products or services. This theoretical lens is chosen over others, such as contingency theory or dynamic capabilities, which have their own merits. Contingency theory emphasises leadership, i.e. the influence of the leader's style on team performance, whereas dynamic capabilities theory is more suited to sudden shifts in the environment (both of these are out of this paper's scope). Furthermore, strategic orientation choice theory has been chosen for its suitability with related topics such as reverse logistics (Hsu et al., 2016).

As a means of achieving HVM, UK manufacturing organisations have pursued the integration of services in their product-base offerings. In the literature, this

phenomenon has been labelled variously as: “product-service systems (PSS)” (e.g. Baines et al., 2007, Pawar et al., 2009) and “servitization” (e.g. Bigdeli et al., 2018, Baines et al., 2017, 2009, Baines and Shi, 2015, Martinez et al., 2010; Bascavusoglu-Moreau and Tether, 2011; Neely et al., 2011; Vandermerwe and Rada, 1988; Vandermerwe, 1990). These concepts are often discussed in relation to HVM (Martinez et al., 2001, 2006, 2008, Bititci et al., 2010) and are dealt with in the following sections. However, in this paper it is posited that a greater integration of services with the product is only one way to achieve HVM, and not the full story. To illuminate the full story, we deal with the concept of value next.

2.1 Value and High Value Manufacturing (HVM)

The concept of “value” has become attractive to researchers and practitioners alike. The mantra of “value creation” has been used in different contexts and for different purposes. Extensive theoretical developments have been carried out to analyse what is meant by “value” for organisations (e.g. Bowman and Ambrosini, 2000).

Several theoretical value frameworks have been proposed. For example, Payne and Holt (2001) presented an overarching framework for relationship value management, which consists of the following elements: value determination, value creation, value delivery and value assessment. Their framework dealt with this at three levels: customers, employees, and stakeholders. Furthermore, Beverland (2012) presented a model summarising the different areas related to “value”. These areas were: value orientation, capabilities, practices and outcomes. They posed some relevant questions for this paper: “What other capabilities help build value? What other practices flow from these capabilities? If value orientation is critical, then how do firms go about such a process? What other outcomes flow from a value orientation?” Beverland (2012: 9).

In a practical vein, Lindgreen et al. (2012) have analysed and proposed useful activities for fostering value in business-to-business (B2B) contexts, namely: structuring, bundling and leveraging of resources. They proposed areas of further research: capabilities management, value metrics, temporal horizon, innovation imperatives, and tactical focus. Surprisingly these authors did not consider value assessment (Lindgreen and Wynstra, 2005).

Ambrosini, Bowman and co-authors (e.g. Ambrosini et al., 2011) have studied extensively the concept of 'value' from the strategic management point of view, where value is created, captured or destroyed (Bowman and Ambrosini, 2010). They have used primarily both RBV and dynamic capabilities as theoretical lenses to frame their research (e.g. Ambrosini et al., 2009, Ambrosini and Bowman, 2009). They focused mainly on differentiating between use value (UV) and exchange value (EV) (Bowman and Ambrosini, 2000).

In this paper value refers to how the product is perceived by the customer in terms of usefulness (use value). Here value is related to the organization's key competences (internal view) and how aligned these are both internally (operational characteristics) and externally according to their key competitive advantage (external view). This paper develops an 'operations management' perspective on value and how the internal and external views of organizations can be reconciled in the context of HVM, which is explained next.

HVM has recently received increased attention from academics and industrialists (e.g. MacBryde et al., 2013, Fothergill and Gore, 2013). Livesey (2006) earlier stated that a HVM company should exhibit a strong financial performance whilst also contributing to strategy and to social impact for three stakeholders: country,

investors and employees. This work resulted in the well-known Livesey’s external value matrix.

An alternative value matrix was proposed by Martinez and co-authors (Martinez, 2003, Martinez and Bititci, 2001, 2006; Martinez et al., 2008). This considers six value propositions, namely: “Innovators”, “Brand Managers”, “Price Minimisers”, “Simplifiers”, “Technological Integrators” and “Socialisers”, see Table 1. These value propositions resulted from combining the three value disciplines of: Product Leadership, Operational Excellence and Customer Intimacy (Treacy and Wiersema, 1993) with the then newly-defined hard and soft dimensions of value. The hard dimension relates to the engineering/technology side of value, whereas the soft dimension relates to the human/interpersonal side of value.

A value discipline according to Treacy and Wiersema (1993: 85) is: “Knowing what they want to provide to customers, they have figured out what they must do to follow through”. As per the division into ‘hard’ and ‘soft’ dimensions, Martinez (2003: 82) explained: “The analysis carried on the development of 'hard' and 'soft' value dimensions started with the application of the decomposition technique to break down the value disciplines into components and bring new insights to the research. Then a categorical aggregation was done to assemble different components into a logic and understandable way, thus these formed two new categories 'hard' and 'soft'. Finally, the interpretation of each category provided a description and understanding of the new groups.”

Table 1: Value matrix showing the six value propositions

HVM Discipline	Dimension	
	Hard	Soft
Product Leadership	Innovators	Brand Managers
Operational Excellence	Price Minimisers	Simplifiers
Customer Intimacy	Technological Integrators	Socialisers

(Source: Martinez and Bititci, 2001)

Martinez (2003) defined the six value propositions as follows. “Innovators” are those organisations which excel at providing innovative products quickly to market; they rely on their Design and R&D capabilities to make this possible, e.g. Apple. “Brand Managers” are those organisations which excel at promoting their image as imbued with high reputation and social status; they rely on their special mix of physical products, brand, services and high price, e.g. Jaguar. “Price minimisers” compete at lowest cost by maximising efficiency and minimising waste; they are mostly in high volume/low variety operations, and they still manage to make a competitive profit margin, e.g. IKEA. “Simplifiers” focus on making transactions with the customer in an uncomplicated, straightforward and standardised way; they achieve this mainly through the web, e.g. Dell. “Technological integrators” focus on providing a customised solution to their selected long-term customers; they do this via their personalised attention through services such as: product delivery, pre and post-purchasing service, product upgrade, installation and maintenance of equipment e.g. Rolls Royce. “Socialisers” build confidence and trust with their customers; by providing careful interpersonal service and building reciprocal relationships, e.g. Union Industries (a manufacturing SME based in Yorkshire UK, making industrial doors).

The value matrix provides a framework to categorise manufacturing organisations according to their predominant value proposition dimension (VPD), recognising that the predominant value proposition is supported by other important (but not predominant) VPDs. A manufacturer could pursue two or more VPDs, but the predominant one determines its position in the market.

MacBryde et al. (2013) studied how prevalent HVM is in Scottish Manufacturing SMEs by using survey and interviews as complementary methodologies.

Their findings suggest an increasing trend for SMEs to emphasise more design and service activities, whilst still supporting and supplementing production activities. They proposed a three-stage model which classifies HVM firms in their journey to higher levels of HVM. This underpins the premise that HVM is a spectrum rather than a dichotomous state of 'low' versus 'high' value, and it also aligns with the work of Bititci et al. (2014) on maturity models.

Previous literature on value and HVM has mostly focused on the 'strategic' aspect of the transformation of businesses to achieve HVM. This needs to be counter-balanced with more research on how to implement strategy through changing the 'operations' aspects of the firm.

The value discipline of customer intimacy relies on services offered to the customer via total solutions or extra customer service. This value discipline constitutes the key link with terminology such as: Product Service Systems (PSS) and servitization, which are explained next.

2.2 Product Service Systems (PSS)

A Product Service System (PSS) has been defined as: "an integrated bundle of products and services which aims at creating customer utility and generating value" (Boehm and Thomas, 2013: 19). This means that it is generally very difficult to separate product from service, as they are provided as a 'package' to the end customer.

Boucher and co-authors (Boucher et al., 2011, Chalal et al., 2013, Elhabib et al., 2010) have researched PSS with different methodologies, e.g. case studies (Boucher et al., 2008) using qualitative narrative analysis, and computer simulations (Elhabib et al., 2010) with quantification of some of the factors involved in PSS. Their overarching concern is the transition from traditional manufacturing to PSS, which includes a change in the combination of: business model, processes and organisation. Table 2

provides a summary of previous research contributions on PSS and provides evidence on the proliferation of literature on PSS. However, as Beuren et al. (2013) have pointed out, previous research is mostly theoretical in nature, so there is a need for additional empirical research. In this respect, this paper contributes to closing this gap by providing further empirical evidence.

Table 2: Literature contributions on Product Service Systems (PSS)

Main contribution	Author(s)
Traditional classification of PSS into: product-oriented, use-oriented or result-oriented groups	Tukker (2004)
PSS continuum of services as “add-on” at one extreme and tangible goods as “add-on” at the other extreme. Triggers, actions and goals for the different stages of developing industrial-base service capabilities, namely the stages of: (1) consolidating product-related services, (2) entering the installed-base service market, from where organisations could choose between (3a) seeking to expand their offerings to relationship-based services or (3b) seeking to expand to process-centred services, the final stage would be (4) taking over the end-user’s operation.	Oliva and Kallenberg (2003)
Level of receptivity to PSS in UK manufacturers as a path-dependent process, which they found was related to both the external environment (including knowledge residing in the external environment, market conditions of the firm and legislation) and the internal environment (including corporate competence, strategic orientation, organisational structure and product portfolio).	Cook et al. (2006)
They proposed a theoretical framework labelled as Functional Hierarchy Modelling (FHM) that takes into account functional hierarchies of part-whole versus means-end. They proposed a refined PSS typology comprising the following stages of development (from low to high): (1) input-based, (2) availability-based, (3) usage-based and (4) performance-based revenue mechanisms, which are sub-divided into: (4a) solution-oriented, (4b) effect-oriented, and (4c) demand fulfilment-oriented. Furthermore, they considered three levels of integration: segregated, semi-integrated and fully-integrated	Van Ostaeyen et al. (2013)
Processes of a PSS within a service lifecycle framework comprising: service requirement, service deployment, service processing and service retirement	Chalal et al. (2013)
Classification of PSS including traditional and green offerings.	Gaiardelli et al. (2014)

2.3 Servitization

Servitization has been described as “a strategy offering customer-focused packages in order to add value” (Bascavusoglu-Moreau and Tether, 2011: 3). The reasons that organisations follow servitization are often cited as: to increase competitiveness, stabilise revenues and increase customer loyalty. Bascavusoglu-Moreau and Tether (2011:3) concluded that servitization does not influence business survival in general, but increases productivity. However, they believed that for higher levels of diversification servitization influences survival positively. More recently, Bigdeli et al. (2018) and Bustinza et al. (2017) have introduced the concept of ‘advanced services’.

Table 3 presents a summary of previous key research contributions on this topic.

Table 3: Literature contributions on Servitization

Main contribution	Author(s)
Supply chain perspective on managing servitized-products. They focused on the key processes involved in managing these and also on industrial practices through case studies. They identified the following key processes of managing: information flows, customer relationships, supply relationships, demand, production, order deliveries, financial flows, returns and end of life, product development and risks. They concluded that information flow management was a particularly important process together with risk management.	Johnson and Mena (2008)
Pose key questions for servitized organisations in terms of their design, delivery, supporting network, assessment and transition from “traditional” manufacturing.	Neely and co-workers (Neely, 2008a, 2008b; Neely et al., 2011, Edwards et al., 2004a, 2004b)
Present the state-of-the-art in servitization research as well identifies avenues for future research. This was re-visited more recently by these authors.	Baines et al. (2009) and Baines et al. (2017)
Propose a model called "the architecture of challenges in servitization" based on the importance of the strategic, operational and social tests that organizations confront when adopting servitization strategies.	Martinez et al. (2010)
Two types of industrial service types, namely services supporting the product (SSPs), and services supporting client actions (SSCs) proposed originally by Mathieu	Eggert et al. (2011)

(2001), and crossed them over with two levels of product innovation activity: high and low. They found that in order to increase directly the long-term profitability of the business, the SSCs were most effective at low levels of production innovation activity, whereas the SSPs were most effective at high levels of production innovation activity.	
Knowledge stocks and knowledge flows associated with the servitization of manufacturing. Their findings point out that the operations community has the highest number of citations to the topic, and that more mature communities - such as services marketing, services operations and operations management - rely on their own locally (within the same academic community) produced knowledge stocks whereas emergent communities - such as PSS and Service Science - rely on more diversified sources of knowledge.	Lightfoot et al. (2013)
There is a need for more research on servitization paths and dynamics.	Gaiardelli et al. (2015)
The service transformation occurs in a continuous change process, i.e. gradual changes across all organizational levels and functions rather than punctuated change.	Martinez et al. (2017)
Propose a Balance Score Card-based framework for the assessment of the transformation of a manufacturing organisation to become a provider of 'advanced services'.	Bigdeli et al. (2018)

Two special issues covering the topic of servitization are mentioned next.

Wilkinson et al. (2009) argued that there was an on-going transformation in manufacturing companies' operations to accommodate all the changes referred to as Product Service Systems (PSS), servitization of manufacturing and increasing value.

Gaiardelli et al. (2015) pointed out that the journey to servitization is proving challenging for manufacturing organisations. The papers presented in those special issues constitute beacons of excellence that illuminate current and future research efforts in this topical area.

The previously discussed topics (value/HVM, PSS and servitization) are all inter-related as they deal with the "transformation" of traditional manufacturing into something "new" and more promising for long-term competitive advantage. The main

difference in their scope is that HVM does not only rely on services to make this transformation/transition, it could also rely on branding, innovation, simplification and improved efficiency too.

3. Research methodology

The HVM literature, specifically in the context of value creation, can be regarded as nascent. To achieve a methodological fit (Yin, 2003, Edmondson and McManus, 2007) between previous work, research method, analysis and expected contribution, we adopted three exploratory case studies and a focus group as our approach (Stake, 1995). Given the nascent literature associated with current understanding of the research phenomenon, adopting case studies as the methodology is appropriate as it permits a deep research enquiry that comes as close to the research phenomenon as possible (Dyer and Wilkins, 1991).

Three case studies involving UK manufacturing companies were studied in accordance with published protocols (Voss et al., 2002, Pettigrew, 1990). Each case study followed the stages: familiarisation, data collection, analysis of results, presentation of individual results, joint analysis, presentation of joint results and report. The typical duration of each case study was three months (from familiarisation, individual case study results to report), with the on-site data collection taking either three or four full working days. It is worth mentioning that the interviewees in the case studies were re-approached during the data collection period, if clarification was needed.

The case studies were carried out sequentially between 2009 and 2011. Each case study used the following techniques: semi-structured interviews, observations of the shop floor and face-to-face administration of a HVM questionnaire. These techniques were supplemented with the collection of documentary data such as: vision,

mission and values statements, financial reports, performance measures, list of their R&D projects and product range.

Within each case study, the organisation's participants were senior managers, e.g. Managing Director, Design Manager, Production Manager, Sales Manager and Marketing Manager. Each semi-structured interview lasted 1.5 hours on average. A total of 18 interviews were recorded, transcribed and analysed. The transcription led to 84 pages of transcribed data (this transcription excluded data from the HVM questionnaire administered during the interview; hence the page count may appear lower than expected). The transcription did not use any voice recognition software, but was carried out manually by the transcriber listening to the audio files and typing verbatim into MS Word. The data from the questionnaires were keyed into MS Excel for quantitative analysis. The qualitative data were analysed manually (by reading, assessing and matching them conceptually to the selected themes for answering the research question) and the results used, where possible, to explain the quantitative findings.

To add further robustness to the data collection, to benchmark the three in-depth case studies against a wider set of results and to counteract the limitation of the case studies in terms of lack of generalization, the additional methodology of focus groups was pursued. This addition follows literature that advocates the use of multiple methods in operations research (Chen et al., 2015).

Saunders et al. (2012:478) define a focus group as a "group interview, composed of small number of participants, facilitated by a 'moderator' in which discussion is focused on aspects of a given theme or topic". So, additional data were obtained from a focus group organised with the participation of further seven manufacturing companies based in the UK. The managers were associated with the seven companies in the focus group, each company's manager filled in the same HVM questionnaire that was used in

the case studies presented in this paper. So, this study included the HVM performance of ten manufacturing organisations in total.

The participation in the focus group was carried out during a two-hour session on “High Value Manufacturing” delivered within a course on a MSc. in Manufacturing Leadership at a UK University business school. The participants were mainly senior managers at their manufacturing organisations mostly drawn from the Yorkshire region in the UK. The participants were able to interact during the session and learn from each other’s comments. Notes were taken during the session the HVM questionnaire was distributed, collected, and preliminary results were discussed with the group at the end of the session.

According to Lincoln and Guba (1986) there should be credibility, transferability, dependability and confirmability to ensure methodological rigour. Each of these aspects was addressed in the following way. For credibility, i.e. confidence in the truth of the findings, multiple case studies, triangulation and additional focus group were carried out. For transferability, i.e. applicability in other contexts, the case study companies were chosen from different manufacturing sectors. Dependability, i.e. that findings are consistent and could be repeated, was ensured by following a step-by-step case study protocol and by triangulation between different sources. For confirmability, i.e. the degree of neutrality or the extent to which the findings are shaped by the respondents and not by researcher bias, an open call was made for participating companies and the researcher collecting the data was an independent and external member to the studied organisations. Table 4 summarises the process of case study analysis in this research.

Table 4: Case study analysis – research process (adapted from Szczepański and Swiatowiec- Szczepańska, 2012)

Phase of case study process	Key decisions	Approach
Linking theory with empirical data	Aim of research	(i) To what extent does the alignment between key competence, competitive priorities and operational performance lead to HVM? and (ii) What are the characteristics of HVM organisations in practice?
Selection and justification of empirical cases	Number of case studies Case study selection method	Brief description of HVM was sent out to companies in the database of Regional businesses, calling for interest. A number of them expressed interest in participating. Three case studies were selected due to time commitment for data collection (1 researcher, part-time dedicated to the project) and budget availability (1 year).
Defining range of studies	Defining the case (unit and range of analysis)	The unit of analysis was the HVM business unit, i.e. organisation/company.
Selecting appropriate data sources	Various sources of data	A range of senior managers were selected in different areas within the company. Interviews were audio recorded. The HVM questionnaire was administered.
Analysis and reduction of data	Method/process of data analysis	The data were analysed by department, e.g. design, manufacturing, sales. Excel was used to identify relevant themes. The HVM questionnaire was analysed using Excel too.
Checking data quality	Method of verification	Since the case studies lasted for three months each, there were opportunities to check understanding of previously collected data items both in person and by email in between visits.
Description and presentation	Presentation and discussion	Presentation of preliminary results was given to each organisation, as well as the joint results presentations which gave provision of feedback opportunities.

4. Results

4.1 Data analysis of the HVM questionnaire

This research used the questionnaire designed by Martinez (2003). The questionnaire had a total of 33 questions, which were divided into three parts: key competence (seven

questions), main competitive advantage (six questions) and operational performance (20 questions). All three parts had questions which were linked to one another, according to their value proposition. Appendix 1 shows the questionnaire.

Each question comprised a statement that required a response on a five-point Likert scale quantified as follows: 0 = Not Applicable (effectively not a point in the scale), 1 = Low, 2 = Low to Medium, 3 = Medium, 4 = High and 5 = Very High. Each interviewee was asked to fill in the questionnaire, during the face-to-face interview, and later the answers for items were combined into scores against the dimensions for the six value propositions.

Theoretical footprints were derived by Martinez' previous empirical work and validated through earlier six case studies (Martinez, 2003). A single predominant HVM proposition for each case study was determined by analysing the theoretical footprints and their scores (which were used to quantify each component of the HVM theoretical footprint) for each of the HVM six value propositions (Huaccho Huatucu et al., 2011). This provided the quantified HVM theoretical footprints (see Table 5) used in this research.

Table 5: Theoretical footprints - quantified HVM propositions (%)

Type of HVM organisation by predominant VPD	Value proposition dimension: VPD (%)						Ideal sequence*
	Innovation	Brand Management	Price Minimisation	Simplification	Technological integration	Socialisation	
Innovators	42	25	13	12	6	2	ABCDEF
Brand Managers	18	35	4	12	10	21	BFADEC
Price Minimisers	12	15	39	27	1	6	CDBAFE
Simplifiers	12	15	10	39	8	16	DFBACE
Technological Integrators	15	8	7	10	33	27	EFADBC
Socialisers	4	6	13	9	16	52	FECDBA

*Note: A= "Innovation"; B= "Brand Management"; C= "Price minimisation"; D = "Simplification"; E = "Technological integration"; F = "Socialisation"

The questionnaire data for the three companies (two SMEs and one large company) in this paper were analysed and the value dimension percentages calculated. The empirical footprint for each case study was constructed and compared to the theoretical footprints. The company was assigned to one value proposition based on the closest matching theoretical footprint and supporting evidence. Note the allocation was not simply made based on the highest-scoring dimension.

In this paper, we focus on the predominant value proposition dimension of each case. In general, a company follows one value proposition, which is the predominant one (but sometimes they might give a similar weighting to a second or third).

The general characteristics of the case study companies reported in this paper are given in Table 6.

Table 6: General characteristics of case study companies

Case	Size	Product	Market	Performance objectives	Respondents
HVM1	SME with 76 employees	Joint hip replacements	Sales: 71% UK and 29% Europe by value. Sales growth UK (+6.6%) and Europe (+11.7%).	To provide good quality products and service, but not to charge the customer substantially for this.	Managing Director, Design manager, Production manager, Planning manager and Sales manager
HVM2	SME employing 20 people	Baths and showers for disabled people	Social and healthcare market. Given the climate of economic recession their new products were not selling as anticipated. HVM2 was keen to find new ways of competing.	To innovate through development of new products.	Owner Managing Director, Technical manager, Production manager, Customer service manager and Commercial manager
HVM3	Large manufacturing employing over 250 people	Products for vehicles to reduce the emission of pollutants in the	The environmental legislation in the UK and Europe about the	To develop technological 'know-how' and expertise by proactively	Managing Director, Technical manager, Marketing

		air. Their two main products involve: Original Equipment Manufacturing (OEM) and Retrofit.	emission of pollutants into the air is projected to tighten, which means good business for HVM3.	scanning the horizon strategically, on the look-out for new products and opportunities.	manager, Head of Operations, Quality Manager, Commercial manager, Financial account & Head of finance, Customer development manager.
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4.2 Case study 1: HVM1

4.2.1. HVM1 predominant proposition

HVM1 can be categorised as a “Socialisor” (F = “Socialisation”, supported by C= “Price Minimisation” and B = “Brand Management”) with predominant value propositions dimensions in **bold [FCBEAD]**. The average scores (out of 5) per VPD are: A = 2.50, B = 3.40, C = 3.54, D = 2.38, E= 3.29 and F = 4.88.

This follows from the comparison with each of the theoretical footprints in Table 5, with the closest matching pattern that of “Socialisor” [**FECDBA**]. The firm differentiates itself by providing excellent customer service. This is reflected in their latest Customer Satisfaction Survey results, as one customer wrote: “I wish all companies were as friendly, helpful and accommodating as [HVM1]”.

HVM1 dealt with their existing and potential customers very well; they were ready to provide learning opportunities and social events so that potential and existing customers could become familiar with the product. HVM1 had identified its competitive strategy as focused on a differentiated service provision surrounding the product. In this connection, HVM1 is ready to go the extra mile for the customer in terms of satisfying their requests, especially since purposefully high inventory levels made it possible to attend to achieve short delivery times. As the General Manager commented:

“We had an incident on Monday where the hospital had forgotten to re-order of a product that was essential for an operation so we arranged for somebody to physically go there by car, deliver the product and then come back. Of course, we made a loss on that but we would have bought a huge amount of good will.”

The second-highest scoring VPD for HVM1 (“Price Minimisation”) reflected that cement-less hip replacements were standardised (limited range of sizes) and not customised, so it was possible to deliver from stock, which allowed them to benefit from economies of scale. As the Production Manager indicated:

“We want the stock turn to be as high as possible – the reason we have a target for lead time/product manufacture because it depends on mix of products we sell in factory – that’s why the target changes because if we were to do a lot of parts, in a particular month, they come out of stock and get processed through clean room, the lead time for those is very fast.”

The third-highest scoring VPD for HVM1 (“Brand Management”) emanated from its good reputation. Since its foundation, HVM1 had not been willing to compromise their product/service quality to preserve profit margins. As the Managing Director of HVM1 stated:

“Even if we had the best product in the market (which for hips we do) that offered all the customers’ needs and excelled well beyond what the competitors’ products gave, we are not then going to therefore think that we can charge a huge price premium for our product so the balance really comes from making sure we fulfil some of Mr [founder] ethos, something that is truly a value for money but is also an extremely good, superior product.”

4.2.2 Case study 1 – business processes

HVM1 is predominantly a “Socialisor” supported by the following business process characteristics: the strategy process focuses on satisfying the customer and encouraging long-term loyalty. The approach to New Product Development (NPD) was to go for the

safer, risk-averse options and their main aim was to provide profit to their charitable foundation. The manufacturing part of the order fulfilment process was enabled by state-of-the-art machinery, standardisation and automation; also the company built up inventory, which enabled HVM1 to deliver from stock if needed. In terms of their Customer Relationship Process, the Sales department were in tune with the market by providing feedback to Production on what products were selling and what the customers would prefer having in future; whereas marketing efforts were varied and reached different outlets. The predominant business processes for HVM1 were Strategy and Order Fulfilment.

4.3 Case study 2: HVM2

4.3.1 HVM2 predominant proposition(s)

HVM2's profile shows an almost equal split among: F = "Socialisation", A = "Innovation" and E = "Technological integration" and B = "Brand Management" with predominant value propositions in **bold [FAEBDC]**. The average scores (out of 5) per VPD are: A = 4.00, B = 3.70, C = 3.18, D = 3.47, E = 3.95 and F = 4.17.

The near equality of four out of six HVM propositions indicates HVM2's ambivalence over their predominant value proposition. This ambivalence is reflected in the fact that the owner-manager carries the strategy in "his/her head", rather than it being explicitly written down. Comparing the company profile with each of the theoretical HVM footprints in Table 5, the closest match was the "Technological Integrator" with theoretical footprint **[EFADBC]**. Note the process is not one of simply selecting the highest-scoring VPD.

HVM2 was not classified as an overall "Socialisor" even though its highest-scoring VPD was "Socialisation", because it clearly deviated much more strongly from

the “Socialisers” theoretical footprint, i.e. [FECDBA]. The weakness on the “Socialisor” value proposition was supported by the Owner Managing Director:

“We are good at quality products. We are not good at getting leverage in the heritage we’ve got. We’re not good at selling. When we are up against competition, we tend to retreat and let the cheaper ones takeover, but we are working towards this. The relationship with customer needs more attention.”

For the third-highest scoring VPD of “Innovation”, the following quote from the Technical Director illustrates:

“We’re very good as a company at the ideas, concepts, it’s designing to the very detail and bringing it into pieces and products that are manufacture-able and economic to make – we are very good at one-offs but it’s really bringing it into the production process that’s difficult.”

4.3.2 Case study 2 – business processes

HVM2 is predominantly a “Technological integrator” supported by an informal strategy process focused on providing customised solutions. The approach to the NPD Process was to invest heavily in R&D. Their Order Fulfilment Process, was characterised by simple manufacturing, with low WIP but with some final product inventory. Their Customer Relationship Process was sluggish, e.g. sales were lower compared to the same months the year before, probably because products were overpriced for a market in recession. The predominant business process for HVM2 was NPD.

4.4 Case study 3: HVM3

4.4.1 HVM3 predominant proposition(s)

HVM3 can be categorised as a “Technological Integrator” (E = “Technological Integration”, supported by F = “Socialisation” and A = “Innovation”) [EFABCD]. The

average scores per VPD are: A = 3.66, B = 3.49, C = 3.24, D = 3.05, E = 4.26 and F = 3.75.

This was well aligned with “Technological Integrators” theoretical footprint [EFADBC] in Table 5. HVM3 differentiates itself by providing good quality products and technological ‘know-how’.

HVM3’s approach to compete by applying the Strength, Weaknesses, Opportunities and Threats (SWOT) strategic framework is crucial to its success. Customers normally buy the product because they need to comply with legislation and therefore they normally rely on the expertise provided by HVM3 for a total solution at a competitive price. As the Commercial manager stated:

“We monitor our sales performance against forecast and budget and monitor competitor activity, responding to competitor pricing competition, unable to make this sale because the competitor is selling, in the Retrofit we have to be very flexible and more responsive in terms of pricing, OEM is agreed at the beginning of the supply contract, only adjusted from cost changes.”

With regard to HVM3’s second-highest scoring VPD of “Socialisation”, they work closely with the customer during the design of the product; although HVM3 does not normally carry out a customer satisfaction survey. As the Commercial director stated:

“Keeping your customer happy: day to day, monitor delivery performance and quality, targets set for them.”

They also carry out these “Socialisation” activities to generate demand, as the Managing Director stated:

“We do a lot of lobbying, employing companies or do it ourselves, lobby governments, local councils, sometimes it works sometimes it does not. We are

members of key working groups, more often than not, it is a politician decision, ‘the Major of London says...’”

In support of their third-highest scoring VPD as “Innovation”, the Commercial manager stated:

“We try to take the lead on technical innovation, we have currently a project for the next [name of product], still in preparation, customer agreements for that product, aim to take it to the market and demonstrate to key potential customers.”

4.4.2 Case study 3 - business processes

HVM3 is predominantly a “Technological integrator” supported by the following business process characteristics: the strategy focuses on scanning the horizon for opportunities. In their NPD Process, the approach to new designs was to work with the customer as closely as possible. Regarding their Order Fulfilment Process, manufacturing was characterised by being complex, with some WIP and final product inventory. Finally, their Customer Relationship Process was in tune with the market which was strongly regulated by legislation that customers had to comply with. So, in a way, HVM3 was sheltered from competition. The predominant business processes for HVM3 were Strategy and NPD.

4.5 Cross-case analysis

Once all three case studies were completed; the joint (i.e. cross-case) analysis took place. See Table 7.

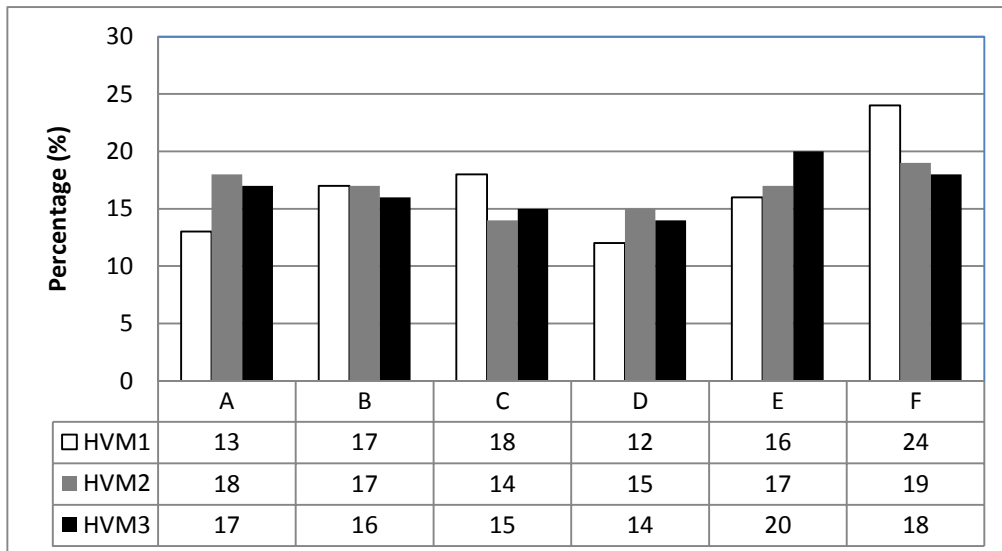
Table 7: Case study – comparative analysis of HVM with emphasis in **bold italics** on key business processes

Business Process	Case study designation		
	HVM1	HVM2	HVM3
Strategy	To provide a personalised service to its customers, with	To provide excellent state of the art, innovative products.	To scan the horizon purposely and to lobby government bodies and

	the emphasis that it is part of a charitable foundation.		policy makers to create business opportunities.
New Product Development (NPD)	Limited to safer bets, conservative approach to risk taking.	Innovative design is the strength of the company, however it comes at a price of large investment.	Provides excellent know-how and engineering in the manufacturing of integrated solutions.
Order Fulfilment	State of the art manufacturing, but mainly standardised, supported by carrying inventory.	Simple, customised, so not much work in progress (WIP), but there is significant final product inventory.	Complex, customised, some work in progress (WIP) and final product inventory.
Customer Relationship Process	As far as Sales are concerned they are selling a product in a box, the target is to sell as many boxes as possible. Representative of sales in hospitals.	Centralised, labelled as “customer services”.	Account managers are the point of contact for specific customer orders.
	Conferences, NHS bids, word of mouth, high retention rate of loyal long-term customers.	Exhibitions, trade publications, website, word of mouth. Low retention of long-term customers.	Website, exhibitions, conferences, word of mouth, high retention of long-term customers.

Note: indicated in **bold italics** are the predominant business processes for each case.

Figure 1 shows the HVM VPDs % (Y-axis) for each of the three case studies grouped by HVM VPDs (X-axis). Comparing the three cases against each other, HVM1 shows the highest “Socialisation” performance, HVM2 shows the highest “Innovation” performance and HVM3 shows the highest “Technological Integration” performance. As indicated earlier, the value propositions assigned to HVM1 and HVM3 agree with the highest-scoring VPD, while HVM2 is assigned a proposition that differs from the highest-scoring VPD. This is because the overall profile for HVM2 best fits being a “Technological Integrator”. This confused company’s positioning could be explained by the evidence in the qualitative results that no clear strategic focus was followed. This could be due to the evidence in the qualitative results that no clear strategic focus was followed.



Note: A= “Innovation”; B= “Brand Management”; C= “Price minimisation”; D = “Simplification”; E = “Technological integration”; F = “Socialisation”

Figure 1: Cross-case comparison of HVM value proposition dimensions (VPDs)

While presenting our final results to the companies, each company declared their interest in pursuing a different ‘desired’ HVM proposition in future rather than the currently diagnosed one (see Table 8). In all three cases, the companies show lower rankings than their ‘desired’ HVM proposition. So, better alignment with the relevant HVM value proposition profile described in Table 1 was recommended. HVM1’s desire to move from “Socialisor” to “Innovator” in the future is anticipated to bring some major challenges. First, it is not only changing value disciplines (from “Customer intimacy” to “Product Leadership”), but also changing value from “Soft” to “Hard” dimensions in the matrix, which is normally more difficult to pursue than the other way around (Martinez, 2012). HVM2’s plan to become a “Socialisor” from “Technological integrator” is more realistic as they are both within the same discipline, i.e. “Customer intimacy”, but also it is anticipated to be easier to transition from “Hard” to “Soft” dimension. HVM3 future plans to become a “Price Minimiser” from “Technological integrator” status is difficult; not least because this is the value proposition where most

UK manufacturers struggle to compete. Nevertheless, it may be still feasible because the value proposition is within the “Hard” dimension of the matrix.

Table 8: Current versus desired HVM propositions

Company	HVM proposition	
	Current	Desired for the future
HVM1	“Socialisor” (ranked third)	“Innovator”, but currently ranked seventh.
HVM2	“Technological Integrator” (ranked sixth)	“Socialisor”, but currently ranked ninth.
HVM3	“Technological Integrator” (ranked first)	“Price Minimiser”, but currently ranked eighth.

Note: Place in brackets show the company’s ranking in the data set of 10 companies

4.6 Focus group

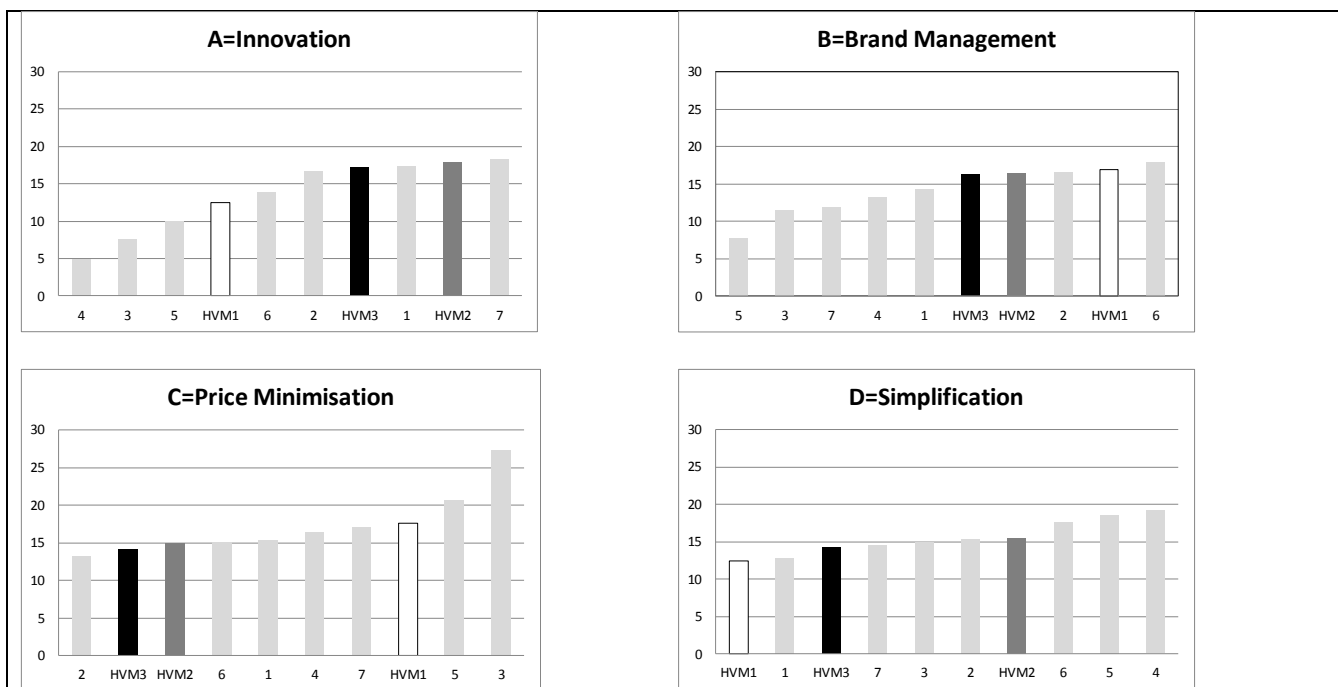
For the focus group, the organisations were five SMEs and two with undisclosed identity. The companies were not selected a priori as HVM for participation in the focus group. However, the nature of the programme the participants were following (on Manufacturing Leadership) suggested that these companies were looking for opportunities for competitive advantage via further training and development of their personnel.

A single informant within each company (mainly the production manager) provided the data. The participants were sponsored by their companies to receive such training as the company’s future leaders, so they could be perceived as the MDs in waiting with a strategic view of their own organisation and a good understanding of their company’s market orientation.

During the focus group, the HVM self-assessment questionnaire provided their company’s classification as follows: three were “Technological integrators” (1, 2 and 7), three were “Socialisors” (3, 4 and 5) and one was a “Simplifier” (6). These classifications provided further evidence for the predominance of the “customer intimacy” traits in UK HVM organisations.

In Figure 2 the results for the ten companies, i.e. three case studies and seven focus group companies, are ranked in order of scores on the individual VPDs. See Appendix 2 for details. The following observations can be made:

- HVM1 is identified as a “Socialisor” and has one of the highest scores on the “Socialisation” VPD. The company also has high scores on “Brand Management” and “Price Minimisation”.
- HVM2 has its highest-scoring VPD in “Socialisation”, but is low in comparison to the other nine. However, its score on “Technological integration” is sixth out of the ten, i.e. HVM2 performs relatively higher on the “Technological integration” than the “Socialisation” VPD.
- HVM3 ranks as the highest scorer on the “Technological integration” VPD of the ten participating companies, thus supporting its assignment to the “Technological Integrator” value proposition.



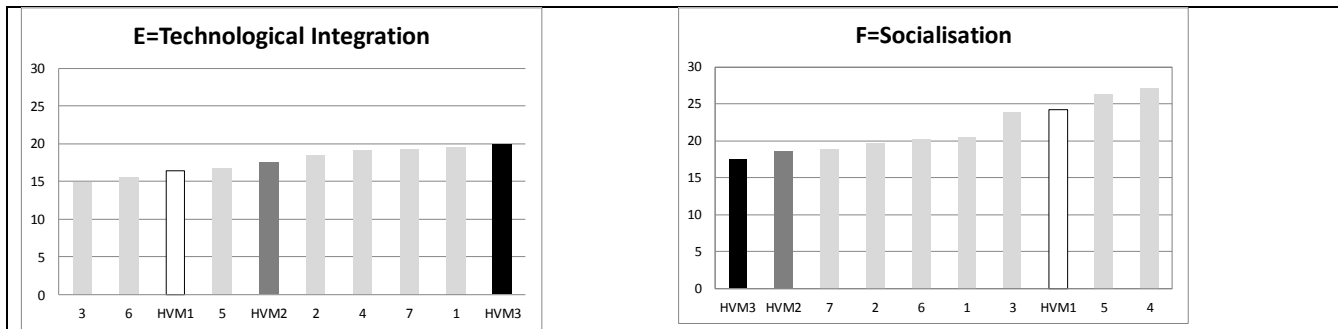


Figure 2: Additional Wider Benchmarking

From the focus group, it was inferred that being a “Price Minimiser” or a “Simplifier” was difficult to achieve for UK manufacturing companies. This is in line with findings that competition on price alone is not possible anymore for advanced economies, such as the UK (MacBryde, 2014). Furthermore, in our combined sample there were seven SMEs (out of ten firms), for which the results are in line with previous research findings stating that SMEs do not normally have the resources for strategic thinking and implementation, in this case for changing HVM propositions. Overall, the characterisation of all three cases fell into the “Customer intimacy” discipline of the Martinez (2003) HVM matrix.

5. Discussion

This paper addressed the research questions: (i) To what extent does the alignment between key competence, competitive priorities and operational performance lead to HVM? and (ii) What are the characteristics of HVM organisations in practice. The strategic orientation theoretical approach (Child, 1972) has provided a theoretical lens against which the results are justified in terms of why organisations make decisions regarding their alignment of strategy and operational focus in a particular way.

The case study results for HVM1 and HVM3 show they were well aligned with their predominant VPDs. This was reflected in their close match with the theoretical

footprints as well as their rankings in the wider benchmarking. We had some difficulty in assigning HVM2 to its predominant VPD and this was reflected in their lower position with their predominant VPD in the wider benchmarking which indicates a lack of strategic focus.

The business processes perspective provided an overarching theme which has been useful for framing the HVM research and underpinning it with relevant research (Bititci et al., 2011a, 2011b). The key characteristics of the managerial and operational business processes that deliver and sustain value in HVM organisations have been unveiled. However, more research is needed to further investigate the extent of the predominance of “customer intimacy” value discipline among UK HVM organisations.

All three in-depth case studies and most of the focus group organisations were found to follow the “customer intimacy” HVM discipline. Customer intimacy is composed of two dimensions, i.e. hard (“Technological integrators”) and soft (“Socialisers”). The managerial and operational business processes considered in this paper were: Strategy, NPD, Order Fulfilment and Customer Relationship.

For the two cases classified as “Technological Integrators”, the companies emphasised their technological ‘know-how’ and innovativeness, aiming to provide total solutions for their customers. Thus, the key business processes for them were NPD and Strategy. For the case classified as “Socialisor”, the key business processes were Strategy and Customer Relationship, in order to provide the overall customer experience. It is worth mentioning the somewhat problematic situation of HVM2. It seems that when one adopts a typology comprised of footprints (i.e. specified configurations comprised of independent dimensions) that a key issue is the extent to which the company’s actual profile comprises a coherent, compatible sets of scores. Some companies have configurations that cohere while others (such as HVM2) display

configurations that are not particularly coherent – which points towards a lack of strategic focus, which needs to be brought to their attention and provide suggestions for improvement.

6. Conclusions

Three in-depth qualitative case studies with HVM companies and a focus group with further seven companies were carried out and provided useful insights. It is concluded that for HVM organisations to deliver and sustain value, they need to understand their managerial and operational business processes. This understanding can be achieved, for example, through the mapping of their business processes, in order to see the situation ‘as is’, then check if they are fit for purpose or they need revising in the light of their strategic focus. In addition, the alignment between their key competences, main competitive advantage and operational performance has to be checked periodically. It is also interesting to see that managers would like to change the current state of their organisations to an ideal future state, which presents them and their organisations with a challenge, e.g. moving from being a “Technological Integrator” to being a “Price Minimiser”. However, this change of value proposition is not simple because it implies a series of changes in strategic, operational, leadership and adaptive capabilities (MacBryde, 2014). The discussion of these capabilities could be another potential avenue for future research.

The implications for theory are two-fold. First, the paper proposes that HVM organisations’ preferred strategic choice is the ‘customer intimacy’ value discipline. This is in line with recent research findings that manufacturers are striving to achieve ways of providing ‘advanced services’ in a way that can be monitored and assessed and improved (Bigdeli et al., 2018). Second, that an organisation’s value proposition belongs to a HVM spectrum and that it can change overtime, i.e. it is not static but

dynamic, however a radical change from current to future desired value proposition (for example from “Socialisor” to “Technological integrator”) is more challenging than an incremental change (for example from “Technological integrator” to “Brand manager”).

The implications for practice are that companies need to be focused on their particular value proposition and not deviate too much as trying to be good at everything will just dilute their efforts. To continue on the journey to higher levels of HVM, manufacturers need to keep this focus as much as possible. However, if they are thinking about changing their value proposition, the change to the ‘desired’ HVM proposition would need to be considered more carefully as the implications are profound. Furthermore, this research has been used to inform policy (Huaccho Huatuco, 2016) on the Westminster Business Forum held in London, which presented the key points of the investigation among others for consideration in future policy discussions. A main limitation often mentioned in connection with case studies is their lack of generalizability. However, this limitation is counteracted by the benefits that case studies provide; amongst these are that they enable the observation of the phenomena in their natural context, so giving a deeper understanding of the organisation’s related issues compared with using other methodologies. A further limitation is that the strategy process analysis in this paper did not consider the individual managerial processes, e.g. management of change, communications, etc. but combined them in one single construct. This detailed analysis remains to be researched. Another limitation of this study is that most of the companies in the combined sample were SMEs, so the results should be taken into account in the light of this; it may well be that large organisations would have mapped out differently in different ‘value disciplines’, i.e. not only on “customer intimacy”.

Further work could include improving the generalisation of results by combining with other methodologies, such as survey questionnaire. In this respect, it would be helpful to initially carry out a longitudinal study, by replicating the case studies within the same organisations at some future date, to see if they have changed their value proposition according to their original aspirations. Another strand of future work could consider the supply chain, first with dyadic relationships between buyers and suppliers then second, see how value changes throughout the supply chain, as has been partially addressed in the study of 'best value supply chains' by Li et al. (2015). However, this could include computer simulations on how value travels up or down the supply chain, for example. Further links between HVM and the relatively similar concept of High Value Engineering (HVE) (Royal Bank of Scotland, 2012) could be explored.

References

- Ambrosini, V., and C. Bowman. 2009. "What are dynamic capabilities and are they a useful construct in strategic management?" *International Journal of Management Reviews*, 11 (1): 29-49.
- Ambrosini, V., C. Bowman, and N. Collier. 2009. "Dynamic Capabilities: An exploration on how firms renew their resource base" *British Journal of Management*, 20: S9-S24.
- Ambrosini, V., C. Bowman and R. Schoenberg. 2011. "Should acquiring firms pursue more than one value creation strategy? An empirical test of acquisition performance" *British Journal of Management*, 22: 173-185.
- Baines, T.S., H.W. Lightfoot, S. Evans, A. Neely., R. Greenough, J. Peppard, R. Roy, E. Shehab, A. Braganza, A. Tiwari, J. R. Alcock, J. P. Angus, M. Bastl., A. Cousens, P. Irving, M. Johnson, J. Kingston, H. Lockett, V. Martinez, P. Michele, D. Tranfield, I.M. Walton, and H. Wilson. 2007. "State of the art in product service systems". *Proceedings for the IMechE Journal of Engineering Manufacture*, 221: 1543-1552.
- Baines, T. S., H. W. Lightfoot, O. Benedittini, and J. M. Kay. 2009. "The servitization of manufacturing: A review of the literature and a reflection on future challenges" *Journal of Manufacturing Technology Management*, 20 (5): 647-567.
- Baines, T., and V. G. Shi. 2015. "A Delphi study to explore the option of servitization in UK companies" *Production Planning & Control*, 26 (14-15), 1171-1187.
- Baines, T., A. Z. Bigdeli, O. F. Businza, V. G. Shi, J. Baldwin, K. Ridgway. 2017. "Servitization: revisiting the state-of-the-art and research priorities" *International Journal of Operations & Production Management*, 37(2): 256-278.

- Bascavusoglu-Moreau, E., and B. Tether. 2011. "Servitisation, Survival and Productivity". Proceedings of DRUID 2011 on innovation, strategy and structure: organisations, institutions, systems and regions, Denmark, 15-17 June 2011.
- Beuren, F.H., M. G. Gomes Ferreira, and P. A. Cauchick Miguel. 2013. "Product-service systems: a literature review on integrated products and services" *Journal of Cleaner Production*, 47, 222–231.
- Beverland, M. B. 2012. "Unpacking value creation and delivery: Orientation, capabilities, practices and outcomes" *Industrial Marketing Management*, 41 (1): 8-10.
- Bigdeli, A. Z., T. Baines, A. Schroeder, S. Brown, E. Musson, V. Guang and A. Calabrese. 2018. Measuring servitization progress and outcome: the case of 'advanced services'. *Production Planning and Control*, 29(4): 315-332.
- Bititci, U.S., K. T. Mendibil, and C. Maguire. 2010. "High Value Manufacturing: A Case Study in Transformation" Proceedings of the Institution of Mechanical Engineers, Part B: *Journal of Engineering Manufacture* October 1, 2010, 224: 10. p. 1599-1614.
- Bititci, U.S., F. Ackerman, A. Ates, J. Davies, P. Garengo, S. Gibb., J. MacBryde, D. Mackay, C. Maguire, R. van der Meer, F. Shafti, M. Bourne, and S.U. Firat. 2011a. "Managerial processes: business processes that sustain performance" *International Journal of Operations & Production Management*, 31(8): 851-891.
- Bititci, U.S., F. Ackerman, A. Ates, J. Davies, S. Gibb, J. MacBryde, D. Mackay, C. Maguire, R. van der Meer, and F. Shafti. 2011b. "Managerial processes: an operations management perspective towards dynamic capabilities" *Production Planning and Control*, 22(2): 157-173.
- Bititci, U.S., P. Garengo, A. Ates, and S. S. Nudurupati. 2014. "Value of maturity models in performance measurement" *International Journal of Production Research*, 53, 10: 3062-3085.
- Boehm, M., and O. Thomas. 2013. "Looking beyond the rim of one's teacup: A multidisciplinary literature review of Product-Service Systems in Information Systems, Business Management, and Engineering & Design", *Journal of Cleaner Production*, 51: 245-260.
- Boucher, X., M. R. Boudarel, and D. Poyard. 2011. "Transition des PME industrielles vers le couplage produits/services". Proceedings of Congrès International de Génie industriel, *CIGI'2011*, Québec, 12-14 October 2011.
- Bowman, C., and V. Ambrosini. 2000. "Value creation versus value capture: Towards a coherent definition of value in strategy" *British Journal of Management*, 11 (1): 1-15.
- Bowman, C., and V. Ambrosini. 2010. "How value is created, captured and destroyed" *European Business Review*, 22(5): 479-495.
- Bustinza, O., F. Vendrell-Herrero and T. Baines. 2017. "Service implementation in manufacturing: An organisational transformation perspective" *International Journal of Production Economics*, 192: 1-8.
- Chalal, M., X. Boucher, G. Marquez, and M.A. Girard. 2013. "Managing transition towards PSS: a production system simulation approach". In: Shimomura, Y. (2013). *The Philosopher's stone for sustainability*, Proceedings of the 4th CIRP International Conference on Industrial Product-Service Systems, Tokyo, Japan, November 8th - 9th, 2012, 429-434, Springer.
- Chen, J, X. Zhao, M. Lewis, and B. Squire. 2015. "A multi-method investigation of buyer power and supplier motivation to share knowledge" *Production and Operations Management*, 25(3): 417-431.

- Child, J. 1972. Organizational structure, environment and performance: The role of strategic choice. *Sociology*, 6(1): 1-22.
- Cook, M.B., T.A. Bhamra, and A. Lemon. 2006. "The transfer and application of Product Service Systems: from academia to UK manufacturing firms" *Journal of Cleaner Production*, 14: 1455-1465.
- Creswell, J. W., and V. L. Plano Clark. 2011. *Designing and Conducting Mixed Methods Research*. 2nd Edition. SAGE Publications Inc. pp. 488.
- Dyer, W.G. Jr., and A. L. Wilkins. 1991. "Better Stories, Not Better Constructs, to Generate Better Theory: A Rejoinder to Eisenhardt" *The Academy of Management Review*, 16(3): 613-619.
- Edmondson, A.C., and S. E. McManus. 2007. "Methodological Fit in Management Field Research" *Academy of Management Review*, 32(4), 1155–1179.
- Edwards, T., G. Battisti, W. Payne McCledon Jr., D. Denyer, and A. Neely. 2004a. Pathways to value: How UK firms can create more value using innovation strategically. *Executive Review*. Advanced Institute of Management Research (AIM Research). 16 p.
- Edwards, T., G. Battisti, W. Payne McCledon Jr., D. Denyer, and A. Neely. 2004b. How can firms in the UK be encouraged to create more value? A discussion and Review paper. Advanced Institute of Management Research (AIM Research). February 2004. 40p.
- Eggert, A., J. Hogreve, W. Ulaga, and E. Muenkhoff. 2011. "Industrial services, product innovations, and firm profitability: A multiple-group latent growth curve analysis." *Industrial Marketing Management*, 40 (5): 661-670.
- Eisenhardt, K.M. 1989. "Building Theories from the Case Study Research" *The Academy of Management Review*, 14(4): 532-550.
- Elhabib, N., X. Boucher, and S. Peillon. 2010. Engineering of Service Oriented Collaborative Networks. PRO-VE 10. 11th IFIP Working Conference on Virtual Enterprises, St Etienne, France, 11-13 October 2010.
- Fothergill, S., and T. Gore. 2013. "Implications for employment of the shift to High-Value Manufacturing" *Future of Manufacturing Project: Evidence paper 9*. Foresight, Government office for Science. 38 p.
- Gaiardelli, P., V. Martinez, and S. Cavalieri. 2015. "The strategic transition to services: a dominant logic perspective and its implications for operations" *Production Planning & Control*, 26:14-15, 1165-1170.
- Gebauer, H. 2008. "Identifying service strategies in product manufacturing companies by exploring environment-strategy configurations" *Industrial Marketing Management*, 37 (3): 278-291.
- Health Tech and Medicines Knowledge Transfer Network and Institute for Manufacturing (IfM) Education and Consultancy services Ltd. 2013. *The future of High Value Manufacturing in the UK*. Knowledge Transfer Network: Health Tech and Medicines.
- Hsu, C.-C., K.-C., Tan, S. Hanim, and M. Zailani. 2016. "Strategic orientations, sustainable supply chain initiatives, and reverse logistics" *International Journal of Operations & Production Management*, 36 (1): 86 - 110
- Huaccho Huatuco, L. 2016. *High Value Manufacturing in the UK*. High Value Manufacturing in the UK – next steps for innovation, investment and competitiveness, Westminster Business Forum, Glaziers Hall, London, 14th July 2016, pp. 69.
- Huaccho Huatuco, L., V. Martinez-Hernandez, T. F. Burgess and N. E. Shaw. 2014. *High Value Manufacturing (HVM): A business processes perspective*. Proceedings of

the British Academy of Management Conference 2014, 9th – 11th September 2014, Belfast, UK.

- Huaccho Huatuco, L., V. Martinez, T. F. Burgess and N. E. Shaw. 2011. Quantifying High Value Manufacturing (HVM) characteristics: Two case studies in the UK manufacturing sector. Proceedings of the British Academy of Management Conference 2011. 13th -15th September 2011, Birmingham, UK.
- Innovate UK (2017) Delivery Plan: Shaping the Future 2017-18.
- Johnson, M., and C. Mena. 2008. "Supply management for servitised products: a multi-industry case study" *International Journal of Production Economics*, 114 (1): 27-39.
- Krajewski, L. J., L. P. Ritzman, and M. K. Malhotra. 2013. *Operations Management: Processes and Supply chains*. Tenth edition. Pearson.
- Li, X., C. Wu, and C. W. Holsapple (2015). "Best-value supply chains and firms' competitive performance: empirical studies of their linkage" *International Journal of Operations & Production Management*, 35 (12): 1688 – 1709.
- Lightfoot H., T. Baines, and P. Smart. 2013. "The servitization of manufacturing: A systematic literature review of interdependent trends" *International Journal of Operations & Production Management*, 33 (11/12): 1408-1434.
- Lincoln, Y.S., and E. G. Guba. 1986. "But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. New directions for program evaluation". *Special Issue Naturalistic Evaluation*, 30: 73-84.
- Lindgreen, A., M. K. Hingley, D. B. Grant, and R.E Morgan. 2012. Editorial to special issue: "Value in business and industrial marketing: past, present, and future". *Industrial Marketing Management*, 41 (1): 4-7.
- Lindgreen, A., and F. Wynstra, F. 2005. "Value in business markets: What do we know? Where are we going?" *Industrial Marketing Management*, 34(7): 732-748.
- Livesey, F. (2006). *Defining High Value Manufacturing*. Cambridge, University of Cambridge, Institute for Manufacturing.
- MacBryde, J., S. Paton, K. Mendibil, and L. Davidson. 2008. "Operations Management in High Value Manufacturing" Proceedings of the 15th European Operations Management Association (EurOMA) Conference, Groningen, The Netherlands.
- MacBryde, J., S. Paton, K. Mendibil, and L. Davidson. 2009. "Towards a model of high-value operational activity" Proceedings of the 16th European Operations Management Association (EurOMA) Conference, 14th – 17th June 2009, Goteborg, Sweden.
- MacBryde, J., S. Paton, and K. Mendibil. 2010. "From manufacturing to high value manufacturing: exploring this transition" *Journal of General Management*, 36 (2): 65-79.
- MacBryde, J., S. Paton, and B. Clegg. 2013. "Understanding high-value manufacturing in Scottish SMEs" *International Journal of Operations & Production Management*, 33 (11-12): 1579-1598.
- MacBryde, J. 2014. "High Value Manufacturing – A dynamic capabilities approach" Research seminar presentation at Leeds University Business School. 5th November 2014.
- Martinez, V., A. Neely, C. Velu, S. Leinster-Evans and D. Bisessar. 2017. "Exploring the journey to services" *International Journal of Production Economics*, 192: 66-80.
- Martinez, V., M. Bastl, M., J. Kingston, and S. Evans. 2010. "Challenges in transforming manufacturing organisations into product-service providers" *Journal of Manufacturing Technology Management*, 21(4): 449-469.

- Martinez, V., A. Neely, R. Guanjie, and A. Smart. 2008. High Value Manufacturing – Delivering on promise. Advanced Institute of Management Research (AIM).
- Martinez, V., and U. Bititci. 2006. Aligning Value Propositions in Supply Chains, *International Journal of Value Chain Management*, 1 (1): 6-18.
- Martinez, V. and U. Bititci. 2001. “The value matrix and its evolution” Proceedings of the 8th European Operations Management Association (EurOMA) Conference, Bath 3rd -5th June, 1, 118-130.
- Martinez, V. 2003. “Understanding value creation: the value matrix and the value cube”, PhD diss., Strathclyde University, Glasgow, UK.
- Mathieu, V. 2001. “Product services: From a service supporting the product to a service supporting the client” *The Journal of Business & Industrial Marketing*, 16 (1): 39–58.
- Neely, A. 2008a. “The servitisation of manufacturing: an analysis of global trends” Proceedings of 4th European Operations management Association Conference, Ankara, Turkey, 10p.
- Neely, A.D. 2008b. “Exploring the Financial Consequences of the Servitization of Manufacturing” *Operations Management Research*, 1(2), 50p.
- Neely, A., O. Beditinni, and I. Visnjic. 2011. “The servitisation of manufacturing: further evidence” Proceedings of the 18th European Operations Management Association conference, Cambridge, July 2011, 10p.
- O’Cass, A., and L.V. Ngo. 2012. “Creating superior customer value for B2B firms through supplier firm capabilities” *Industrial Marketing Management*, 41 (4): 125-135.
- Oliva, R., and R. Kallenberg. 2003. “Managing the transition from products to services”. *International Journal of Service Industry Management*, 14(2): 160-172.
- Pawar, K.S., A. Beltagui, and J.C. K. H. Riedel. 2009. “The PSO triangle: designing product, service and organisation to create value” *International Journal of Operations & Production Management*, 29(5): 468-493.
- Payne, A. and S. Holt .2001. “Diagnosing customer value: Integrating the value process and relationship marketing” *British Journal of Management*, 12(2): 159-182.
- Pettigrew, A. 1990. “Longitudinal field research on change: theory and practice”, *Organization Science*, 1 (3): 267–292.
- Porter, M.E., and C. H.M. Ketels. 2003. UK Competitiveness: Moving to the next stage. DTI Economics Paper No. 3.
- Royal Bank of Scotland. 2012. The future of UK High Value Engineering: An insight into the future of the UK HVE segment. 35 pp.
- Saunders, M., P. Lewis and A. Thornhill (2003). *Research Methods for Business Students*. 3rd Edition. Prentice Hall, Financial Times.
- Stake, R.E. 1995. *The Art of Case Study Research*, Sage Publications, Thousand Oaks, California, USA.
- Szczepański, R. and J. Swiatowiec- Szczepańska. 2012. “Risk management system in business relationships – Polish case studies” *Industrial Marketing Management*. 41(5): 790-799.
- Treacy, M., and F. Wiersema. 1993. Customer intimacy and other value disciplines. *Harvard Business Review*, Jan-Feb 1993: 84-93.
- Tukker, A. 2004. “Eight types of product service system: eight ways to sustainability? Experiences from SusProNet” *Business Strategy and the Environment*, 13(4): 246-260.
- Vandermerwe, S. and J. Rada. 1988. “Servitization of business: Adding value by adding services” *European Management Journal*, 6 (4): 314-324.

- Vandermerwe, S. 1990. "The market power is in the services: because the value is in the results" *European Management Journal*, 8 (4): 464-473.
- Van Ostaeyen, J., A. van Horenbeek, A., L. Pintelon, and J. R. Duflou. 2013. "A refined typology of Product-Service Systems based on Functional Hierarchy Modeling" *Journal of Cleaner Production*, 51: 261-276.
- Voss, C., N. Tsiriktsis, and M. Frohlich. 2002. "Case research in operations management" *International Journal of Operations & Production Management*, 22 (2): 195-219.
- Wilkinson, A.; A. Dainty, and A.D. Neely. 2009. "Changing Times and Changing Timescales: The Servitization of Manufacturing" *International Journal of Operations & Production Management*, 29 (5): 425-430.
- Yin, R. K. 2003. *Case Study Research: Design and Methods*, Third Edition. London: Sage Publications.