

Contributions to Management Science

Gerd Kaufmann

Aligning Lean and Value-based Management

Operations and Financial Functions
at the System Level



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Aligning Lean and Value-based Management

Operations and Financial Functions
at the System Level

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The thesis is submitted in partial fulfilment of the requirements for the award of the degree of Doctor of Business Administration (DBA) of the University of Portsmouth.

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*Dedicated to the greatest people in my life:
my beloved kids Julian and Leon.*

*In memoriam of my grandma Anni Kaufmann.
She was always my greatest “fan”,
from the day I was born
till the day she died.*

Abstract

This thesis explores the relationship and compatibility of the approaches of lean management (LM) and value-based management (VBM). Previous researchers studying LM and VBM have agreed on the need to harmonise VBM, as the management control system (MSC), with the operational strategy in general and in particular with regard to the employment of LM. But despite a decade of scholarly calls for such research, the overarching relation between LM and VBM at the system level has received virtually no attention.

In finally answering these calls, this study initially familiarises the reader with the concepts and key characteristics of LM and VBM. While reviewing these two approaches, it finds that surprisingly neither the term “value” nor the term “value driver” is clearly defined. Therefore, a new definition of both terms is presented that captures and harmonises both areas. Subsequently, a systematic assessment of LM literature against the six-step normative VBM framework of Ittner and Larcker (2001) is conducted, to determine lean’s compatibility with VBM based on existing knowledge. This appraisal finds that although LM is overall highly capable of contributing to the normative VBM demands, there remains a key gap: the lack of a sufficient lean value driver model. This gap is filled, based on the author’s research philosophy of critical realism, by employing a two-step approach, which comprises the creation of an entirely new lean value driver model that forms the foundation for the primary empirical research, collecting data through interviews with 10 top managers having extensive experience in LM.

Empirical data provide sufficient evidence regarding the validity of the newly developed conceptual model. Furthermore, highly valuable fresh insights are gained regarding the role and importance of different lean stakeholders, their importance, requirements, contributions, and relationships. The resulting final model, which is also the main contribution of this thesis, is found to be superior to previous attempts to apply existing approaches, such as the balanced scorecard (BSC) or value trees, to the lean environment. Furthermore, the model improves LM and VBM professional

practice, as it fosters a shared understanding of the value creation process within a lean system and thereby helps to remove existing barriers. Finally, it supports future fruitful alliances between a company's operational and financial communities, thus enhancing the benefits to the enterprise and its stakeholders.

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Almost 4 years ago, I started a journey that ought to become one of the most formative experiences of my life. Today, as I am about to end this intensive, exciting, and challenging trip, it is about time to reflect on the companions on this great adventure. If it were not for their assistance, support, and encouragement, this thesis might never have been written.

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Abbreviations

B2B	Business-to-business
BSC	Balanced scorecard
CEO	Chief executive officer
CFO	Chief financial officer
COO	Chief operations officer
DBA	Doctor of business administration
EVA®	Economic value-added (a trademarked metric from Stern, Stewart and Co.)
IMVP	International Motor Vehicle Program
KPI	Key performance indicator
LM	Lean management
MAS	Management accounting system
MCS	Management control system
MIT	Massachusetts Institute of Technology
OEM	Original equipment manufacturer
OTD	On-time delivery
PDCA	Plan-do-check-act
SMART	Specific, measurable, assignable, realistic, and time-related
SMED	Single Minute Exchange of Die
TPS	Toyota Production System
VBM	Value-based management

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Chapter 1

Introducing the Study of Lean and Value-Based Management



1.1 Introduction

Since its beginnings in the 1990s, lean management (LM)—an operations management system characterised by its principal attribute of high stakeholder emphasis, focusing first on customer value and second on the interests of all other relevant stakeholders (Burton & Boeder, 2003; Murman et al., 2002; Nightingale & Srinivasan, 2011)—has gained remarkable prominence and become the prevailing philosophy of countless firms throughout various industries (Bhamu & Singh Sangwan, 2014). In parallel, value-based management (VBM)—which emphasises the enhancement of shareholder value to be the main driver of a company's success (Ittner & Larcker, 2001; Lueg & Schäffer, 2010; Rappaport, 1986)—has increasingly gained business relevance and turned out to be a generally accepted management control system (MCS) for over 20 years (Coenenberg & Salfeld, 2007).

It is likely for both management approaches (i.e., LM and VBM) to be employed in parallel in many companies, as both have been widely employed for decades and attested to be of major importance throughout business reality (regarding LM, see for example Albliwi, Antony, Abdul Halim Lim, & van der Wiele, 2014; Bortolotti, Boscari, & Danese, 2015; Fullerton, Kennedy, & Widener, 2013; Kennedy & Widener, 2008; Losonci & Demeter, 2013; Marley & Ward, 2013; Moreira, Alves, & Sousa, 2010; Tillema & van der Steen, 2015—regarding VBM, see for example Beck, 2014; Beck & Britzelmaier, 2011, 2012; Blume, Rapp, Wiedemann, & Wolff, 2015; Burkert & Lueg, 2013; Coenenberg & Salfeld, 2007; Cozmiuc & Petrișor, 2015; Haspeslagh, Noda, & Boulous, 2001; Largani, Kaviani, & Abdollahpour, 2012; Malmi & Ikäheimo, 2003).

Both lean and accounting scholars have been long aware of the need to harmonise operational and financial strategies to overcome implicit tensions (Bellisario, Appolloni, & Ranalli, 2015; Bhasin, 2015; Fullerton et al., 2013; Fullerton, Kennedy, & Widener, 2014; Ittner & Larcker, 1995, 2001; Kennedy & Widener, 2008; Maskell, Baggaley, & Grasso, 2012; Meade, Kumar, & White, 2010; Tillema

& van der Steen, 2015). Otherwise, due to standard accounting and control systems and financial functions' lack of understanding of the principles and effects of lean, which commonly lead to temporarily decreasing profits when initially implemented, the lean initiative may be doomed to fail. According to Maskell et al. (2012), these traditional "systems do not work for companies pursuing lean [. . .]; indeed they are actively harmful" (p. 2), a view that has been similarly outlined by Tillema and van der Steen (2015) and Cooper and Maskell (2008).

Meade et al. (2010) further supplement that "If this issue is not well understood by the leadership of the firm [. . .], issues will arise with the lean programme. These issues could easily result in resistance to the continuation of the programme" (p. 869).

Hence, Fullerton et al. (2014) emphasises that "it is not enough for operations management to implement a well-executed lean manufacturing strategy. Instead, operations management must work with accountants to ensure that the underlying financial control data are aligned with lean manufacturing initiatives" (p. 425). Similarly, Maskell (2000) argues that "the financial community [needs] to contribute to the implementation of lean [. . .], instead of remaining on the side-lines, waiting for improvements to show up on the bottom line" (p. 46).

However, actual research in this field is criticised as remaining rare (Fullerton et al., 2013, 2014), and "accounting research [. . .] has been slow to recognise the importance of aligning management accounting and control practices with a lean manufacturing strategy" (Fullerton et al., 2013, p. 50). Furthermore, although "numerous alternative accounting approaches have been developed over the last 25 years, there is still dissatisfaction amongst academics and practitioners in developing an alternative approach to address this issue" (Darlington, Found, & Francis, 2016, p. 79).

Moreover, most of the research in this field is mainly concerned with the adjustment of the management accounting system (MAS) towards the specific requirements of lean, whereas the overarching MCS perspective, including elements such as vision and mission, key objectives, or organisational structure (Ferreira & Otley, 2009) are barely taken into account. In addition, the perspective from which lean proponents conduct their investigation is commonly limited to the perspective of lean production or value stream, instead of that of a holistic business management approach which encompasses the entire lean system (e.g. Bellisario et al., 2015; Daniel, Lee, & Reitsperger, 2011; Darlington et al., 2016; Fullerton et al., 2013; Fullerton & McWatters, 2004; Kennedy & Widener, 2008; Maskell et al., 2012; Pettit, 2000).

Although scholars broadly agree on the need to integrate the MCS and the operations system as a prerequisite for business to prosper (Tillema & van der Steen, 2015), and despite repeated calls from scholars (e.g. Fullerton et al., 2013; Ittner & Larcker, 2001; Tillema & van der Steen, 2015) to foster this alignment, the relations between MCSs and the operations systems in general, and the concepts of LM and VBM in particular, have hardly received any attention, at least from an entrepreneurial and overarching perspective. This impression is supported by Charifzadeh, Taschner, and Bettache (2013), who state that "although the topics of

lean [...] and value-based management are treated separately in the literature in detail, so far there has been no systematic research on the interaction of these management concepts” (p. 49).

Hence, this thesis aims to contribute to theoretical and professional practical knowledge through an extensive exploration of the relationship and compatibility of both approaches at the system level and to provide the means that support a shared understanding which finally establishes the basis to remove existing barriers and instead forges fruitful alliances between operations and finance functions.

Based on an initial assessment of lean literature, this thesis will reveal that existing lean knowledge is overall highly capable of contributing to normative VBM demands. However, it will also expose that the most vital part of fully qualifying LM as a VBM approach is missing: a sufficient value driver model. This gap will be closed by this thesis through the development of a conceptual model and its empirical validation and refinement based on the analysis of interview data from top management lean professionals.

Table 1.1 summarises the study’s framework as proposed by Watson (1994).

The first step of this academic journey is to further confirm the gap in knowledge (Sect. 1.2). Subsequently the specific aims, objectives and related research questions are set out (Sect. 1.3). In addition, the scope and limitations of the thesis are defined (Sect. 1.4). Finally, the structure of the dissertation is explained in detail, providing guidance and a synopsis of the content of each chapter (Sect. 1.5).

Table 1.1 What, why and how framework

Question	Description according to Watson (1994)	Answer related to study at hand
What?	What puzzles/intrigues me! What do I want to know more about/understand better? What are my key research questions?	To explore the relationship and compatibility of LM and VBM and to provide the means that support a shared understanding between operations and the finance functions
Why?	Why will this be of enough interest to others to be published as a thesis, book, paper, guide to practitioners or policy makers? Can research be justified as a contribution to knowledge?	If the approaches are not aligned and a shared understanding between operations and the finance functions is missing, resistance of the latter to the continuation of the lean programme might occur, which could lead to its failure
How—conceptually?	What models, concepts and theories can I draw on/develop to answer my research questions! How can these be brought together into a basic conceptual framework to guide my investigation?	• Literature review • Development of a conceptual model • Empirical validation and refinement of the conceptual model • See Chaps. 3 and 4 for further details
How—practically?	What investigative styles and techniques shall I use to apply my conceptual framework (both to gather material and analyse it)? How shall I gain and maintain access to information sources?	• Interviews with top management lean professionals • See Chap. 5 for further details

Source: Adapted from Watson (1994, p. 80)

1.2 Verifying the Lack of Knowledge

To validate the existence of a relevant research gap, a primary literature review was conducted, aiming to provide evidence that research concerning the relationship between LM and VBM at an overarching conceptual level is neither comprehensive nor sufficient.

The search strategy used to find the relevant studies was derived from Webster and Watson (2002), Tranfield, Denyer, and Smart (2003) and Okoli and Schabram (2010) and included the following respects:

1. Search strings and strategy
2. Types of sources
3. Databases
4. Search period

1.2.1 Search Strings and Strategy

In order to ensure a thorough evaluation of previous research, the first step was to determine appropriate search strings regarding the individual concepts of LM and VBM. Therefore, preliminary keywords were selected and refined based on those found within the results.

For LM, the obvious first string was “lean management”. However, this string was too narrow in terminology, as research focused on “lean philosophy”, “lean thinking”, or “lean accounting” (the latter often related to MAS or MCS) would have been missed. Although the original intention was to avoid the inclusion of subjects such as “lean production” or “lean manufacturing”, as they indicate an isolated perspective towards the production environment instead of the entire system, it was decided to use the broadest term “lean”, to avoid overlooking any relevant research.

The starting point for VBM was the terms “value-based management”, “shareholder value” and “management control system”. Additional keywords that regularly appeared within the results were “economic value-added” and “stockholder wealth”, which were added to the search.

To prevent missing research due to slightly different spelling, the search strings included truncation,¹ leading to the following search strings list:

- “lean”
- “value-based manag*” (results did not differ with or without hyphen)
- “sharehold* val*”
- “manag* contro* syste*”

¹The asterisk (*) matches multiple letters and creates searches in which there are unknown characters, multiple spellings or various endings. It is also used between words to match any additional word.

- “economic value-added” (results did not differ with or without hyphen)
- “stockhold* wealth”

To be considered for this review, publications had to meet the search string “lean” and any of the other search strings related to VBM within at least one of the search fields: title, abstract, or subject. This approach is an accepted method to identify relevant publications leading to a reliable outcome (Buhl, Röglinger, Stöckl, & Braunwarth, 2011).

1.2.2 Types of Sources

The search was limited to peer-reviewed academic journals, conference materials, books and dissertations. Considering the language of most relevant literature as well as the native language of the author, the research was further limited to English and German. Furthermore, results needed to be available either online or in print.

1.2.3 Databases

The data investigation was performed by using the EBSCO Discovery Service provided by the University of Portsmouth, which contains the common and renowned databases for academic research: Business Source Complete, Credo Reference, Emerald, Engineering Village, JSTOR, IEEE Explore, Nexis, ProQuest, ScienceDirect, Scopus, Web of Science, Westlaw, and Wiley.

1.2.4 Search Period

The chosen search period began in 1988, the year when Krafcik (1988) initially coined the term “lean”, and ended in 2017, with the most recent data available.² A summary of the search criteria is shown in Table 1.2.

1.2.5 Findings

To ensure a comprehensive evaluation of previous research, the first step was to determine the literature universe regarding the individual search strings according to

²The search was conducted on 13.01.2015 and last updated on 20.11.2017.

Table 1.2 Literature search criteria to validate the research gap

Criterion	Description		
Search strategy	• “lean”	AND	• “value-based manag*” • “sharehold* val*” • “manag* contro* syste*” • “economic value-added” • “stockhold* wealth”
	Within at least title, abstract or subject		
Types of sources	English- and German-language peer-reviewed academic journals, conference materials, books and dissertations; full text available (online or print)		
Databases	EBSCO Discovery Service including all major databases as: Business Source Complete, Credo Reference, Emerald, Engineering Village, JSTOR, IEEE Explore, Nexis, ProQuest, ScienceDirect, Scopus, Web of Science, Westlaw, Wiley		
Search period	Literature from 1988 to 2017		

Table 1.3 Individual search string results

Search string LM	Number of results	Search string VBM	Number of results
“lean”	141,821	“value-based manag*”	1017
		“sharehold* val*”	6582
		“manag* contro* syste*”	2416
		“economic value-added”	2255
		“stockhold* wealth”	2080
		Total	14,350

Table 1.4 Joined search string results

Search string LM		Search string VBM	Number of results
“lean”	AND	“value-based manag*”	32
		“sharehold* val*”	
		“manag* contro* syste*”	
		“economic value-added”	
		“stockhold* wealth”	

the above criteria. Hence, they were initially tested separately, in order to evaluate the amount of related existing literature.

The results shown in Table 1.3 provide evidence that a large body of research is available, considering the individual search terms. As previously mentioned, the term “lean” is quite extensive, which explains why this term had tenfold more matches than did all VBM-related strings.

As a next step the search was undertaken in conjunction, as defined in the previous section. The results of this joined search are shown in Table 1.4.

To the author's own surprise, the research strategy only brought up 32 results,³ each of which has been studied in detail. Only eight of the papers actually discuss the link between LM and VBM, shareholder value or MSCs, although none of the reviewed works deal with this relationship in-depth, let alone from an overarching and conceptual perspective.

In their conference paper, Alpenberg and Scarbrough (2014) examine the issues and modification needs for MCS, when lean is implemented. However, neither is their perspective holistic from a lean point of view—as they limit their investigation to the operations process, but not the entire lean eco-system—nor do they consider the entirety of an MCS, but limit their interest to finance and reporting topics. Nevertheless, the authors emphasise the need for a conceptual basis for the alignment and revision of the MCS when lean is implemented.

Similarly, Bellisario et al. (2015) highlight the importance of aligning lean and MCSs, yet in their article they examine the relation between lean production and the balanced score card (BSC), putting the latter on a level with an entire MCS; by contrast, VBM literature (e.g. Ittner & Larcker, 2001; Lueg & Schäffer, 2010) argues that the BSC is only one potential element within the holistic concept.

The previously cited work of Charifzadeh et al. (2013), stating that no systematic research on the interaction of lean and VBM has been conducted so far, provides a description regarding the effects of lean on the financial drivers that create shareholder value. This account is quite similar to the one offered by Pettit (2000). Again, however, the two scholars limit their examination to a specific element of VBM, which is the top level key performance indicator (KPI). Furthermore, there is no consideration of lean as an entire system; rather, a solely production-related shop floor perspective is taken.

Daniel et al. (2011) and Stanescu, Dumitrache, Curaj, Caramihai, and Chircor (2002) present two studies which, on the one hand, claim the need to align lean with the MCS, but on the other, limit their investigations to a specific and, in turn, non-holistic perspective regarding both concepts. While the former discuss only aspects of lean manufacturing (focusing on quality, inventory, flexibility, and related control measures), Stanescu et al. (2002) are concerned with IT architecture issues related to the alignment and especially the provision of information. Similarly, Sharpe (1998) explores the MSC within lean organisations only on a shop floor level within the limited scope of the production facility.

Finally, Emmitt, Sander, and Christoffersen (2005) are the only authors discussing VBM in a lean context that highlight the necessity to create value for all stakeholders, pointing out that value has a different meaning for each of them. However, their study also lacks consideration of lean as an entire system, being limited to a lean construction perspective. In addition, this study offers no discussion of VBM as a MCS at all.

Apart from the above, the remaining 24 results are not strongly relevant to the topic of interest. Some scholars examine individual aspects of lean and MAS

³A complete list of the identified research is presented in the appendix.

(e.g. Ahmed & Damodaram, 1993; Kennedy & Widener, 2008; Klingenberg & Geurts, 2009; Kristensen & Israelsen, 2014). Others simply consider lean to be nothing else than a mean strategy for downsizing and cost cutting, aimed solely at increasing shareholder value, without providing any further discussion of the relationship between LM and VBM, let alone regarding the concept's specifics (e.g. Barsky, Hussein, & Jablonsky, 1999; Goldstein, 2012; Matzler, Rier, Hinterhuber, Renzl, & Stadler, 2005). Lastly, there are authors who simply mention terms related to lean and VBM in passing, while neither the relation nor the concepts are central to their studies (e.g. Dumitrescu, Tent, & Dumitrescu, 2010; Houška, Wolfová, & Fiedler, 2004; Mertins & Jochem, 2001; Snee, 2005; Strachotová, 2008).

The results from the review substantiated the previous assumption of a lack of knowledge concerning the holistic relationship between LM and VBM. Hence, this research is justified through the importance of both management approaches and their agreed, yet barely explored, overarching conceptual alignment.

1.3 Research Aim, Objectives and Research Questions

Based on the previous subsections, the following can be summarised:

- LM and VBM appear to have distinct characteristics and to be different in how they conceive value and value creation.
- Although the literature emphasises the need to align the operational strategy and the MCS, most research remains at a level where only lean production specifics and their relationships with accounting systems are explored, without considering the overarching perspective of the concepts.
- The literature review that has been conducted supports the above assumption that although there are examples of where lean operational practices have been integrated into VBM control systems (e.g. Charifzadeh et al., 2013; Pettit, 2000), there have not been concerted attempts to reconcile the two approaches at the system level.

Due to the above, and particularly considering the barely explored relationship of the two approaches on a conceptual level, on the one hand, and the necessity to align the operational strategy with the MSC, on the other hand, the foremost question that arises is whether and to what extent LM can be integrated with VBM.

Hence, the guiding research aim of this study is to critically assess the relationship between the concepts of LM and VBM and to provide the means that foster a shared understanding between operations and the finance functions.

This overarching aim is addressed through the employment of three more specific research objectives and associated research questions (RQs):