



Value Chain Integration – A Framework for Assessment

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Abstract. Despite an abundance of research on the topic, firms continue to struggle with integrating their value chains in order to create and deliver more value to customers. Silo-thinking (rather than systems-thinking) is a typical symptom of poorly integrated value chains. In this paper, we explore the enablers of better value chain integration, before developing and presenting a framework that can be used for assessing the maturity of value chain integration in organizations. We draw on practical insights from a multiple case study of several diverse companies currently working with the systematic integration of their value chains.

Keywords: Value chain integration · Maturity assessment · Multiple case study

1 Introduction

Organizations often struggle to integrate their value chains due to specific factors, such as the presence of a “silo-culture” as well as a lack of documentation or systematization [1, 2]. For example, defending silos over teamwork has emerged as a symptom of big company disease [3]. Moreover, having little flexibility in written descriptions and infrastructure could also lead to unreliable integration processes, particularly if employees choose to create their own routines besides those described in the system. Value creating processes must act together and there should be aligned and balanced intra-organizational coordination capabilities, in order to achieve a value chain that is well-managed [4]. Such a well-managed value chain is referred to as an *integrated value chain* that provides optimized value for the customer [5, 6]. As such, focusing on the interfaces between functions or process steps has been relevant for decades. Literature has various interpretations of the term “integration”, the content and framing are varying, and few authors present a formal definition [2, 7]. The main purpose of this article is to extend existing knowledge identifying the enablers and disablers of integration within the value chain for different sectors. By studying what enables value chain integration, and which mechanisms are used to facilitate integration in five different organizations within different sectors in Norway, the following research questions will be addressed:

Research question (RQ) 1: *What are the enablers of better value chain integration?*

RQ2: *How can firms increase the degree of integration throughout the value chain?*

2 Theoretical Background: Enablers for Achieving Integration in Value Chains

To answer RQ1, we carried out a review of the extant literature. The following seven enablers for achieving integration in value chains were formally identified during the literature search, and provide the basis for the rest of the investigation (Table 1):

Table 1. Enablers of value chain integration

Enablers of value chain integration	Identified in:
Culture (social mechanisms and the creation of lateral relations)	[8, 9]
Management support (vertical integration)	[1, 2, 5, 9–14]
Consensus	[2]
Formalization (standardization)	[15, 16]
Information systems	[17, 18]
Facility and layout	[19, 20]
Measurements and rewards	[21, 22]

3 Research Design

Guided by the research questions, the research approach adopted for this study is a multiple case study design that builds on the identification of enablers for value chain integration that were identified in the previous section. Partly to serve as illustrative cases and partly to demonstrate practical usage of the integration theory, the case studies were conducted in different industries and different types of companies. The cases also serve to provide empirical insights into enablers and disablers of better integration in internal value chains. The main reason for choosing a case-study approach, according to [23], is its distinct advantage in situations wherein “how”, “what” and “why” type questions are posed in order to understand a complex phenomenon. When selecting cases for studying, there are several criteria to consider, i.e. what data are accessible, type of context and if the data is suitable for testing for the chosen approach. Within this study, the dominant criteria for selecting the case organizations has been the convenience sample [24]. We chose to study the phenomena within different industries in order to have the possibility to illustrate the topic from different perspectives and to build a foundation for the research to be generalizable for different industries. To increase the robustness of the research [25], data triangulation was ensured by using multiple sources when collecting the data, such as documents and direct observations in the field [26].

3.1 Case Study Overview

The case companies in this study are two mass producers (MPI & MPII), a craft producer (CP), a hospital (H) and a service provider (SP), each of which are presented below. The units of analysis in these different organizations are the value-adding elements of their internal value chains. As stated in [2], “the only way to truly assess the level of integration is by collecting data from respondents responsible for different value creating processes.” Consequently, this research focuses on ensuring that at least two employees were interviewed within each process step of the value-adding elements of the value chain. Interviewees ranged from operators and team leaders to more senior managers, as well as trade union representatives. A summary of the case studies can be found in the following Table 2:

Table 2. Case study overview

	MPI	MPII	H	CP	SP
Main Product/area of study	Auto components	Aluminium billets	Thrombolysis ward	Leisure boats	Insurance & banking
No of employees	37	513	265	20	1200
No of interviews	11	16	15	12	8

4 Discussion: Towards a Theoretical Framework for Value Chain Integration

Based on the theory from the literature study and the observations made during the case study research, we have been able to construct a model that provides insight into the relationships of each of the enablers for value chain integration. The model is illustrated in Fig. 1:

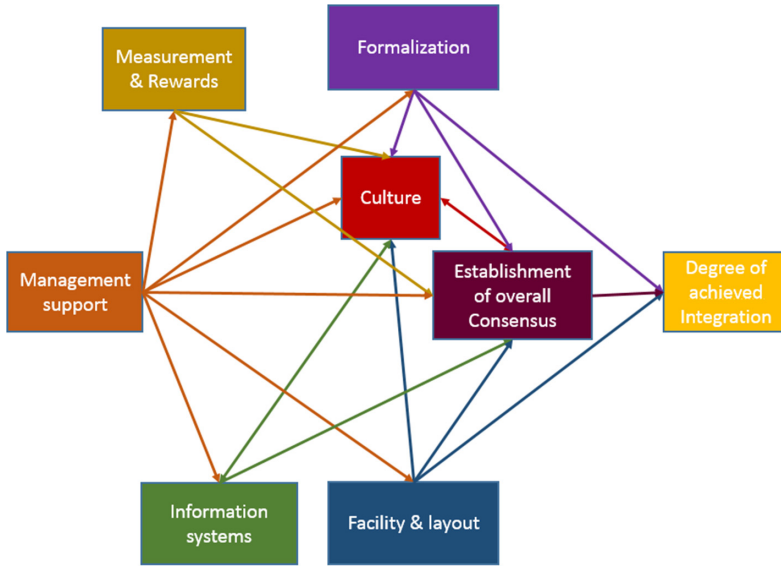


Fig. 1. Theoretical framework for value chain integration

We suggest that the model can be used as the basis for a value chain integration maturity assessment tool, to help improve the integration of value chains in and across organizations. To exemplify how this could be applied to improve the integration of a value chain, we provide a theoretical example using data from MPII. The mechanisms were rated according to the extent to which the researchers found evidence for each mechanism during the case study, following the scale defined. (It should be noted that this rating should normally be performed by the company representatives themselves, who would rate the mechanisms according to their own experiences with them). After the rating procedure, the average rating per category is calculated. Table 3 presents an overview of the distribution and scoring of several examples within the given categories *Consensus*, *Culture*, and *Facility & Layout*:

Table 3 Maturity model for value chain integration

	Low		Somewhat		High		Average
	Definitely not				Definitely		
Use of mechanisms within each category	1	2	3	4	5		
Consensus integration							
The overall strategy is transferred down to individual measures				x			4
The employees are involved in the process of deriving KPI's (to avoid mistrust)			x				3
The overall strategy is well known					x		5
The employees support the overall strategy				x			4
There is a correlation between management focus and employee focus				x			4
All the managers agree upon the business strategy			x				3
Count per score value	0	0	2	3	1		3,83
Culture, social mechanisms and creation of lateral relations							
The personell are available at the value chain				x			4
The employees have confidence in systems				x			4
Degree of acknowledgement of colleagues				x			4
Degree of focus on customer among the employees				x			4
Degree of openness among the employees				x			4
Degree on focus on the entire value chain				x			4
The employees have focus on the interrelation of the process steps				x			4
There exists an informal culture				x			4
The employees have an information sharing mentality				x			4
The use of job rotation is consistent when possible throughout the value chain				x			4
The employees have knowledge of other departments				x			4
The employees have team work experience					x		5
The transfer of managers is used to increase the integration					x		5
There is a use of cross functional teams				x			4
The employees are used to standardized work				x			4
Count per score value	0	0	0	13	2		4,13
Facility and layout							
The employees are co-located			x				3
The plant layout is small and transparent				x			4
The layout contains no partitions				x			4
Count per score value	0	0	1	2	0		3,67

The result is a maturity level on the scale 1–5, where 1 indicates a very poor level of value chain integration and 5 indicates very good level of value chain integration.

5 Conclusion and Further Research

The results of this research support the view of [27] in that integration is a multidimensional concept. This may explain why, when studying an individual category, it is often seen that it can directly or indirectly influence one or more other categories. It can also be observed that some enablers or disablers might be placed under several categories and that an enabler could be a disabler, or vice versa, depending on circumstances. Despite several years of research on the topic of integration, there remains a need for further research to achieve a greater understanding of this concept [7, 28]. Many different terms and definitions are used within this field, and some authors do not even use any definitions. Given that such inconsistency exists within this area of study, this research was intended to address the need for greater clarification and to provide a holistic overview of integration measures in the value chain. Furthermore, this article contributes to providing an enhanced understanding of which enablers can influence the levels of integration between two or more process steps. As an initial step toward gaining a more generic understanding of the topic, five case companies were studied. Moreover, a value chain integration maturity assessment model was constructed. This can be used to support practitioners when attempting to improve the value chain integration through identifying actions to strengthen such integration.

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