Dynamic Capabilities and Target Costing in Swedish Publicly Traded Companies

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ABSTRACT

The increased importance of product development can be seen in both recent research on Dynamic Capabilities as well as research on the use of Target Costing (TC). The Dynamic Capabilities literature is primarily developed in the USA and Europe, while the TC practice is rooted in Japanese practices and has been transferred to the west. This study examines the relationship between the Dynamic Capabilities of the product development team and the implementation of Target Costing (TC) in publicly traded companies in Sweden. Using established concepts from both the Dynamic Capabilities and Target Costing literatures we find partial support for the relationship. We suggest that there may be a bias in the development of Dynamic Capability research that does not comprehend organization practices such as those seen in Japan, Sweden and in Lean Production Organisations more generally. Reasons for this are discussed and proposals for further research are proposed.

Keywords: *Dynamic capabilities, product development, target costing*

INTRODUCTION

Over the past several decades growing international competition and rapid technological changes have put pressure on both manufacturing and non-manufacturing companies to continuously develop new products in order to maintain and improve their competitive position (Iranmanesh

and Thomson, 2008; Yazdifar & Askarany, 2012). As a consequence, the product development process has received attention in large number of studies. Since both the performance of the product as well as the bulk of its cost structure is determined in the early development phase (Ansari et al., 1997) it has become increasingly important to further investigate this area. The purpose of this study is to explore the relation of dynamic capabilities in the product development process to Target Costing programs (TC) in Swedish publicly traded companies.

Different theories in the area of strategy explain the sources of competitive advantage, and they draw from either a market-based view or resource-based view. From the market based view, research demonstrates the importance of developing products in line with the customer's value expectations, which includes quality, functionality and price (Porter, 1980; Cooper, 1995; Cooper and Slagmulder, 1997). These three characteristics, which Cooper (1995) calls the "survival tripod", are linked to long term success of the company, and are key components in the product development phase. As a contrast, the resource based view emphasizes the resources and capabilities within the company as the foundation for competitive advantage (i.e. Penrose, 1959; Wang and Ahmed, 2007). The essence of the resource based view is that Organisations are collections of resources, which are used according to administrative decisions, and each organization becomes unique as a consequence of their use of these resources (Penrose, 1959). A recent strain of literature out of the resource based view focuses on dynamic capabilities.

The concept of dynamic capability can be traced back to Teece et al. (1997) who came up with the idea that dynamic capabilities are the ultimate source of competitive advantage and that these capabilities are necessary elements for companies to survive in an increasingly competitive environment. Dynamic capabilities, which emphasize efficiency and firm-specific capabilities within the company in order to achieve competitive advantage, are used to enhance existing resource configurations (Teece et al., 1997; Eisenhardt and Martin, 2000; Knight and Collier, 2009). Dynamic capabilities reside in the potential to change resources, routines and competences (Prieto et al. 2009) and they are defined as "the organizational and strategic routines by which firms achieve new resource configurations as markets emerge, collide, split, evolve and die" (Eisenhardt and Martin, 2000; Tecce et al. 1997). Zahra et al. (2006) view dynamic capabilities as an ability to reconfigure a

firm's resources and operational competences in the way the organization's principal decision maker decides. According to Knight and Collier (2009) dynamic capabilities are developed in response to perceived environmental change; learning about external conditions; and internal pressure towards change. Knight and Collier (2009) argue that, generally, dynamic capabilities can provide a lens for how an organization can leverage their resources through management accounting techniques, thus pushing new routines to develop. They examine target costing in particular.

Dynamic capabilities in product development have been explored by a number of researchers (i.e. Danneels, 2002; Marsh and Stock, 2003, 2006; Verona and Ravasi, 2003; Prieto et al., 2009). The authors argue that product development is an essential function by which the company can "create, integrate, recombine and shed resources and capabilities". Prieto et al. (2009) argue that dynamic capabilities shape product development competences and that a context characterized by a combination of autonomy, performance management, support and trust is better able to facilitate dynamic capabilities for continuous product development. In existing empirical studies on dynamic capabilities, which primarily are based on qualitative case studies, the knowledge process is the foundation for creating capabilities (i.e. Eisenhardt and Martin, 2000; Prieto and Easterby-Smith, 2006; Verona and Ravasi, 2003; Wang and Ahmed, 2007; Zollo and Winter, 2002). Research on dynamic capabilities in product development examines primarily the processes used to solve problems related to concept development, product and process engineering, pilot production and market introduction (Marsh and Stock, 2006; Prieto et al., 2009). In order to solve these problems, management accounting techniques, like target costing, can be a useful routine, and it can, itself, also become a dynamic capability to improve the use of resources (Knight and Collier, 2009; Banker et al., 2002; Hemmer, 1996; Horngren, 2004; Kenny and Fahy, 2011)

As a management accounting technique Target Costing (TC) is a strategic profit planning and cost management tool, which is used during the early stages in the product development process (i.e. Monden and Hamada, 1991; Tani et al.1994; Ansari et al., 1997; Dekker and Smidt, 2003; Ibusuki and Kaminski, 2007; Ax et al.2008; Filomena et al., 2009; Yazdifar and Askarany, 2011). A study by Afonso et al. (2008) concludes that the use of TC positively correlates with successful product development, which is also

in line with Everaert and Bruggeman (2002) which found that TC permitted the development of lower-cost products without compromising quality and time. TC is often associated with Japanese firms, i.e. Toyota, and originated in Japan in the 1960s, although several of the ideas can be traced back to General Electric during World War II, and their value engineering program (Dekker and Smidt, 2003), which aimed to design products that could do more with fewer parts. In the product development process, which is the focus for this study, TC primarily sets the target for long term profit planning; meanwhile the identification of where cost reduction can be achieved is done through recursive application of Value Engineering to the TC target (Ibusiku and Kaminski, 2007). Very high degrees of competence and trust between departments are required, which is consistent with historical Japanese practices of job rotation.

TC is not a traditional costing method in the sense that it does not have a measurement focus. Rather, TC is a process to connect customer's perceptions of product value attributes with the product's functions and cost (Ansari et al., 1997) in the product development phase. Cooper and Slagmulder (1997) define TC as a technique to manage future profits in the organization. The rationale behind the method starts with determining the target price the customer is willing to pay for the product, which is done through market research or observations. The target profit, which is the required profit per unit determined by the managers or owners, is than deducted from the target price and the TC is the residual (Monden, 1991; Ansari et al., 1997; Cooper and Slagmulder, 1997; Ax et al., 2008). New product development projects therefore must include a focus on lower product cost and enhanced quality and functionality without an increase in price (Ibusuki and Kaminski, 2007).

Studies reveal how TC has spread both within Japan (i.e. Tani et al., 1994; Lorino, 1995; Feil et al., 2004), but also to other countries (i.e. Israelsen et al., 1996; Chenhall and Langfield-Smith, 1998; Dekker and Smidt, 2003; Ax et al., 2008; Kocsoy et al. 2008; Yazdifar and Askarany, 2011; Hamood et al., 2013). Tani et al. (1994) studied the use of TC in Japanese manufacturing companies and they found that the method was used by a wide variety of manufacturing industries. The adoption rate of TC was over 60 percent of their sample of 180 listed manufacturing firms. The fact that TC has gained a lot of attention in Japan is supported by Lorino (1995) who stated that over

80 percent of the large manufacturing companies in Japan are using TC. In a comprehensive review of the TC-literature, Ansari et al., (1997) claim that TC is being adopted increasingly by leading companies worldwide. Empirical studies on the adoption of TC in Western companies support this claim (i.e. Israelsen et al., 1996; Chenhall and Langfield-Smith, 1998; Dekker and Smidt, 2003; Ax et al., 2008; Yazdifar and Askarany, 2011; Akhbari et al. 2012). In a Danish study by Israelsen et al. (1996), the adoption rate of TC by Danish companies was 50 percent, meanwhile Chenhall and Langfield-Smith (1998) found that of 78 large Australian manufacturing firms, 38 percent claimed to use TC. Dekker and Smidt (2003) found that TC, or similar techniques, were used by 59 percent of the listed manufacturing companies in the Netherlands and their findings additionally suggest that TC or related techniques were more common among companies with intense competition and high environmental uncertainty. In line with this, Ax et al. (2008) found that 24.6 percent of their respondents, which included both small- and medium-sized companies as well as large Swedish manufacturing engineering companies, use TC. This indicates that TC is less prevalent in Swedish companies. In a study by Yazdifar and Askarany (2011) we find an extended scope to include both service and manufacturing companies in Australia, New Zealand and the UK. Their results indicate that the adoption rate of TC is not more than 18.3 percent in any of the three countries.

In this study, TC is seen as a Management Accounting method that is connected to the development of dynamic capabilities in the area of product development. Management accounting techniques viewed through this dynamic capability lens have been examined by Knight and Collier (2009), using a case study approach to probe the underlying organizational process of implementing TC.

The remainder of the paper is organized as follows. In the next section we present a literature review in which we derive two hypotheses. In section 3, the design of the study is presented and in section 4 the results from the statistical analysis is discussed. Section 5 draws conclusions and provides options for further research.

LITERATURE REVIEW AND SUPPORT FOR HYPOTHESES

Despite being addressed in different studies, there is no consensus on TC's key characteristics and benefits (i.e. Ansari et al., 1997; Cooper and Slagmulder, 1997; Ellram, 2002, 2006; Ibusuki and Kaminski, 2007; Ax et al., 2008). In the following sections a literature review is presented.

Internal Benefits of using TC

The internal *benefits of using TC* are frequently studied, and a multitude of articles conclude that: TC is a proactive approach to cost management which; directs Organisations focus towards customers (i.e. Ewert and Ernst, 1999; Filomena et al., 2003; Ax et al., 2008; Zengin and Ada, 2010; Dekker and Smidt, 2003); improves the quality of the products and the processes (Ansari et al., 1997; Ibusuki and Kamenski, 2007; removes barriers between departments through multifunctional teams (Ansari et al., 1997; Cooper and Slagulder, 1999); enhances employee awareness and augments their participation and empowerment (Cooper and Slagmulder, 1999; Ibusuki and Kaminski, 2007); fosters co-operation and even creates partnerships with suppliers; reduces non-value-added activities (Ansare et al., 1997); encourages selection of activities with the lowest cost (Zengin and Ada, 2010; Ansari et al., 1997; Ibusuki and Kaminski, 2007); reduces delivery time to market (Cooper and Chew, 1996; Afonso et al., 2008; Iranmanesh and Thomson, 2008; Yazdifar and Askarany, 2012). Tani et al. (1994) found that the product development engineers in Japanese companies play an important role in the use of TC and are key determinants of whether the potential benefits can be captured in the organization.

Success Factors

Ansari et al. (1997) identified several *success factors* for implementation of TC. A key element is leadership, and the following subcategories were used for the factors: behavioural; cultural; technical/structural; and political. The behavioural factors focus on what the organization needs to do in order to succeed with TC and a set of sub factors were identified: communication; motivation; morale and performance measurement. Cultural factors included focus on customers, cross functional cooperation, openness and trust among

employees. Among the technical/structural factors, Ansari et al. (1997) argue that proper methods for data collection and investments in appropriate equipment together with cross-functional teams play an important role in successfully implementing TC. Lastly, the buy-in from other employees and managers is an essential political factor, as well as the buy-in from suppliers. Additionally, Chenhall and Langfield-Smith (1998) points out that a successful implementation of TC requires detailed planning and a high employee involvement during the entire implementation process. It also requires an ongoing interaction between engineers in the product development with all other departments/functions within the company (Hiromoto, 1988). Tani et al.(1994) showed that product design and product planning departments showed the highest rate of involvement in the TC process.

The stronger the Success Factors in an organization the more we should expect the organization to derive benefits from TC.

Performance Results

Performance results from implementing TC have been studied extensively (i.e., Zengin and Ada, 2010; Kee, 2010; Ansari et al., 1997; Clifton et al., 2004; Afonso et al., 2008). Afonso et al. (2008) found in a study of Portuguese manufacturing companies, that the users of TC were able to reduce cycle time in the product development phase without compromising quality and functionality. Clifton et al. (2004) point out that TC plays a role in: orienting the company towards the customer; connecting the customer requirements to product design and setting cost targets that regularly can be evaluated. Chenhall and Langfield-Smith (1998) argues that TC is increasing the involvement across different departments and also worker engagement in product and process innovations. Additionally, TC is connecting profit planning with market research and value analysis. This has lead to improved product design and product development, according to Chenhall and Langfield-Smith (1998). Cooper and Slagmulder (1997) emphasize that one of the performance results from TC is that the company can reduce cost before it is locked in. Thus we see that a tightly interlocked organization in the sense seen in Japan is a good basis for TC.

The stronger the Benefits from TC experienced in an organization, the more we should expect the organization to derive the type of Performance Results

described above. Further, the stronger the Success Factors experienced in an organization, the more likely they are to attain the Performance Results.

Dynamic Capabilities

Knight and Collier (2009) show how management accounting techniques can be a *dynamic capability* and how it can be used to leverage organizational resources. In their qualitative study of the automotive industry, Knight and Collier (2009) found that the adoption of target costing in particular organizational settings can provide decision useful information for the improvement of capabilities and improvements in the resource base. Additionally, they concluded from their case study, that the role of the managers is crucial for accessing external knowledge resources and transferring these to new internal routines in order to develop new and sustaining dynamic capabilities. In their study, a failure in managerial capabilities to counteract the impact of pressures for cost reduction in the introduction of target costing lead to a failure for target costing as a dynamic managerial capability.

According to Prieto et al. (2009) dynamic capabilities emphasize a company's ongoing pursuit of renewal, reconfiguration and integration of their resources, capabilities and competences. Prior studies emphasize product development as a knowledge-related process (Iansiti and Clark, 1994; Lawson and Samson, 2001; Verona and Ravasi, 2003) and how new products rely on new concepts and new technologies that consist of skills, experience and knowledge (Iansiti and Clark, 1994; Prieto et al. 2009).

In the area of product development, dynamic capabilities can be separated into three core elements: *knowledge generation*, *knowledge integration* and *knowledge reconfiguration* (Teece et al., 1997; Teece, 2007 and Prieto et al., 2009). In this study we draw from Prieto et al. (2009) who use these three distinctive knowledge processes related to dynamic capabilities. Firstly, knowledge generation in product development is the development of specific activities for problem-recognition and problem-solving as well as knowledge to develop and launch new products. Secondly, knowledge integration is the combination of knowledge and skills in people from different departments in order to design and develop a specific product. Knowledge is disclosed and shared as part of the product development process. The third process,

which is knowledge reconfiguration, involves the ability to sense the need for reorganization and recombining knowledge or patterns embedded in products and activities through establishment of flexible relationships and teams (Prieto et al., 2009).

It is clear that this concept of Dynamic Capabilities in new product development can apply to the TC method and its relation to the established concepts of TC Benefit, Success Factors and Performance Result. In all cases a higher level of Dynamic Capabilities should lead to higher levels of the other three concepts. We examine both internal outcomes (TC Benefit) and external outcomes (Performance Result). Thus, we propose:

> **H1a:** *strong Dynamic Capabilities and strong Success Factors lead to strong Benefits from TC*
>
> **H1b:** *strong Dynamic Capabilities and strong Success Factors and strong Benefits from TC lead to strong Performance Results*

Dysfunctional Aspects of TC

Lastly, several studies have identified *dysfunctional aspects* that can arise from implementing TC. The following areas are among the most common: an overemphasis on customer orientation can lead to market confusion and extend the time to market for new products (Kato et al., 1995; Ansari et al., 1997); burnout of employees and suppliers (Ansari et al., 1997; Kato et al., 1995; Zengin and Ada, 2010) and increasing conflicts among departments (Ansari et al., 1997; Zengin and Ada, 2010). Davila and Wouters (2004) pointed out that TC is less useful for products where technology, time-to-market or demanding customers are more important to a product's success than its cost. Kee (2010) argues that one of the deficiencies of target costing involves its failure to incorporate the cost of capital into production-related decisions.

The occurrence of Dysfunctional Behaviours appears to be a possible impact on Performance Results, with a higher amount of Dysfunctional Behaviours leading to lower Performance Results. As well it appears that strong Dynamic Capabilities would lead to lower Dysfunctional Behaviours. Thus:

H2: *stronger Benefits from TC and lower levels of Dysfunctional Behavours lead to higher levels of Performance Results.*

Higher levels of Dynamic Capabilities may also influence the level of Dysfunctional Behaviour by providing the sophistication of management abilities to develop a more balanced approach to TC.

In the following section we describe how we gathered the empirical data to test these hypotheses as well as the empirical description of the data set.

RESEARCH METHODOLOGY

Data Collection

The data for this study was gathered through a web-based survey of publicly traded Swedish companies, listed on the Nasdaq OMX Nordic Stockholm. In order to include as many companies as possible, companies from the following three categories were chosen: Large Cap-, Mid Cap-and Small Cap. In total 59 large companies are listed on the Large Cap list, which are companies with an accumulated stock value over 1 billion Euro. The number of Mid Cap companies is 72 (stock value between 150 million Euro to 1 billion Euro) and Small Cap is 116 (stock value less than 150 million Euro). Web surveys have outperformed both mail and fax surveys when it comes to response rate and time (Ax et al., 2008). The empirical data were gathered during the spring of 2012 through two independent sub-studies focused on either Large Cap companies or Mid Cap and Small Cap firms.

The sampling frame for the Large Cap sub-study excluded 19 companies which were either investment companies or raw material companies since previous research suggests that TC is a typical manufacturing or engineering phenomena (i.e. Dekker and Smidt, 2003; Davila and Wouters, 2004; Ax et al., 2008). To broaden the scope, surveys where sent to the remaining 40 Large Cap firms, which included both manufacturing and non-manufacturing activities. 32 (80%) respondents answered the survey. In the other sub-study the surveys were sent to the entire population of Mid Cap and Small Cap firms, totalling 188 survey's. 95 (50%) of the respondents answered the survey (47 from Mid Cap and 48 from Small Cap). In table 1, the number of users of TC is presented.

Table 1: Number of TC users in the study

	Large Cap (n=32) 80% response rate		Small and medium-sized (n=95) 50% response rate		Total users
TC use	Yes	No	Yes	No	
Manufacturing companies	22	7	10	49	32
Service companies	0	3	2	36	2
Total	22	10	12	83	34

In order to obtain as high response rate as possible, all the companies from the sample were contacted through an email or a phone call. The main purpose of the initial contact was to identify a contact person to which the survey could be sent and also to gain some interest from the respondents to participate. The web address of the survey was emailed to each contact person in the product development department or related area. The first emails were sent out in March of 2012 and two reminders where sent out to all participating companies within the next two months.

Variables

All the variables were derived from the literature described above, and listed in Table 2. All scales were assessed using Cronbach's alpha and, all except for two sub scales of Dynamic Capabilities (Knowledge Integration and Knowledge Re-creation), had acceptable reliability scores. To strengthen the validity and reliability of the variables used, the design of the questionnaire was based on previous research (i.e. Ansari et atl., 1997; Cooper and Slagmulder, 1999; Dekker and Smidt, 2003; Prieto et atl., 2009). In the questionnaire (see appendix A), a short text summary of the TC concept was given to the respondents. Among the small and medium-sized companies, two of the responding firms had developed a different name for their new product development method; however the textual description allowed it to be identified as TC.

Two of the sub-components of the Dynamic Capability measure do not have adequate Cronbach's Alphas: Knowledge Integration and Knowledge Re-creation.

Table 2: Variables used in the study

Variable	Explanation	Cronbach's Alpha	Source
TC Benefit	The sum of the benefits	0.848	Ansari et atl., 1997
Dysfunctional Behaviours	The sum of the Dysfunctional Behaviours items	0.771	Ansari et atl., 1997; Cooper and Slagmulder, 1999; Kato, 1993
Performance Result	The sum of the Performance Results items	0.854	Ansari et atl., 1997; Ibusuki and Kamenski, 2007; Dekker and Smidt, 2003;Zengin and Ada, 2010; Kee, 2010; Clifton et atl., 2004; Afonso et atl., 2008
Success Factors	The sum of the Success Factors items	0.905	Ansari et atl., 1997
Dynamic Capabilities – Overall	The sum of the Dynamic Capabilities items	0.843	Prieto et atl., 2009
Dynamic Capabilities – KG	The sum of items in sub-scale Knowledge Generation	0.746	Prieto et atl., 2009
Dynamic Capabilities – KI	The sum of items in the sub-scale Knowledge Integration	0.517	Prieto et atl., 2009
Dynamic Capabilities – KC	The sum of items in the sub-scale Knowledge Recreation	0.625	Prieto et atl., 2009

RESULTS

Descriptive Statistics

In table 3 we see that TC is used across the span of new product development stages, notably, almost all TC users use it in the planning stage. The use is very high in all stages. The level of use may seem surprising, however Sweden is one of the most advanced economies, in general, as well as being one of the most innovative. In particular, Swedish companies are extremely

exposed to international competition and are attuned to improvement possibilities. Thus new methods may get more traction in Sweden than in other locations.

Table 3: Stages of new product development and use of target costing

Stage of new product development	Total (%) n=32
Idea stage	23 (74.2%)
Planning stage	30 (96.8%)
Development stage	28 (90.3%)
Design for production stage	23 (74.2%)
Production stage	28 (90.3%)

In table 4 we see the goals that users had for TC as part of their decision to pursue the TC method. The most mentioned goal was to "achieve budgeted profit", and "cost planning", both of which are, of course, tightly linked with the professional descriptions of the benefits of the TC process. Interestingly the two least frequently selected goals were "faster new product introduction", and "increase in quality". This is interesting because both are frequently discussed benefits of TC. However, these aspects are a bit more subtle and may be later arriving in the TC maturity life cycle.

Table 4: Goals when implementing target costing

Goals when implementing TC	Small and medium-sized companies (n=12)	Large companies (n=16)	Total (%)
Achieve budgeted profit	10 (83%)	16	26 (81.3%)
Achieve a high product quality	4 (33%)	12	16 (50%)
Fullfill customer satisfaction	6 (50%)	15	21 (65.6%)
Faster product introduction	5 (42%)	7	12 (37.5%)
Cost planning	8 (66%)	10	18 (56.3%)
Achieve low cost	7 (58%)	14	21 (65.6%)
Target a set selling price	7 (58%)	13	20 (62.5%)
All of the above	4 (36.4%)	5	9

In the following sections the hypotheses developed earlier will be examined.

Hypothesis Tests

We tested the three hypotheses developed above with ordinary least squares regressions. Correlation among the variables is presented in Table 5. This table tests for simple relationships between the variables. It is interesting to note the low level of correlation in the dataset. The variable Performance Results is significantly correlated with both the summary Dynamic Capability variable as well as the sub-scales. Also, the main Dynamic Capability variable is correlated with all of its subscales.

Table 5: Correlations matrix major variables

	TC benefits	Success Factors	Dys-functional Behaviour	Perf. Results	Dynamic Capabilities (DC)	DC Knowledge Generation	DC Knowledge Integration	DC Knowledge Re-creation
TC benefits	1							
Success Factors	-.074	1						
Dysfunctional Behaviours	.131	-.362	1					
Performance Results	.300	.006	-.013	1				
Dynamic Capabilities	.165	.279	-.029	.607**	1			
DC Knowledge Generation	.177	.150	.032	.597**	.856**	1		
DC Knowledge Integration	.105	.355	-.060	.408*	.893**	.657**	1	
DC Knowledge Recreation	.110	.288	-.134	.556**	.880**	.585**	.710**	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Tables 6, 7, 8 and 9 present the results of the regression analysis.

Tables 6 and 7 examine H1A. Table 6 tests the ability of Dynamic Capabilities and the Success Factors existing in the organization to predict the Benefits inhering from using TC (hypothesis 1A). The model is not significant. For a more granular examination, Table 7 extends this by examining the relationship between the sub-scales of the Dynamic Capabilities variable to determine if any of the three sub-scales had a stronger relationship. The model is not significant. As discussed below, this is surprising given the strong support in the literature as well as the reliability of the variables.

Table 6: Test of Hypothesis 1: Dynamic capabilities + Success Factors = TC benefits

ANOVA for TC Benefits					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	3.980	2	1.990	.430	.656[b]
Residual	106.481	23	4.630		
Total	110.462	25			

Predictors: (Constant), Index Success Factors, Index DC

Coefficients for TC Benefits[a]					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	Std. Error	Beta		
(Constant)	2.878	3.581		.804	.430
Index DC	.070	.077	.192	.902	.376
Index Success Factors	-.022	.047	-.098	-.458	.651

a. Dependent Variable: TCbenefits

Table 7: Dynamic Capabilities Sub-Scales + Success Factors = TC benefits

ANOVA for TC benefits[a]					
Model	**Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**
Regression	3.779	4	.945	.181	.946[b]
Residual	104.461	20	5.223		
Total	108.240	24			

Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.328	4.022		.827	.418
Index Success Factors	-.010	.054	-.0.47	-1.94	.849
Knowledge Generation	.170	.277	.186	.614	.546
Knowledge Integration	-.117	.424	-.100	-.275	.786
Knowledge Re-creation	.078	.290	.086	.269	.790

Table 8 examines H1B by testing the ability of Dynamic Capabilities, Success Factors, and TC Benefits to predict the Performance Results experienced by TC users. The overall model is significant, however only the variable Dynamic Capabilities is significant in predicting Performance Results.

Table 8: Dynamic Capabilities + Success Factors + TC benefits = Performance Results

NOVA for Performance Results

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	**Regression**	815.569	3	271.856	5.005	.009[b]
	Residual	1140.591	21	54.314		
	Total	1956.160	24			

Coefficients[a]

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std.Error	Beta		
1	**(Constant)**	9.595	12.302		.780	.444
	Benefits from TC	.255	.358	.142	.713	.484
	Index DC	.894	.279	.584	3.202	.004
	Index Success Factors	-.018	.178	-.020	-.102	.919

a. Dependent Variable: Index PR

Table 9 examines the relation between Dysfunctional Behaviours and Benefits from TC as they relate to Performance Results from using TC (Hypothesis 2). The model is not significant. Again, this is surprising given the prior results and the robustness of the measured variables.

Table 9: Test of Hypothesis 2: Dysfunctional behaviors + TC benefits = Performance Results

ANOVA for Performance Results

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	**Regression**	359.901	2	179.951	1.191	.321[b]
	Residual	3625.284	24	151.054		
	Total	3985.185	26			

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	42.092	9.710		4.335	.000
Benefits from TC	1.769	1.153	.302	1.534	.138
Dysfunctional Behaviour	-.055	.857	-.013	-.064	.949

CONCLUSION AND DISCUSSION

Recent research suggests that high levels of Dynamic Capabilities, as described by Teece et al. (1997) and Verona and Ravasi (2003), are important in developing product design competency. We extend this to focus on the specific product design tool of Target Costing. Recent attempts by Prieto et al. (2009) to operationalize the variables associated with this approach appear to have been successful in the Spanish context, which answered a criticism that there was only poor operationalization of the Dynamic Capabilities constructs (Pavlou & El Sawy, 2004). Our data is drawn from Swedish publicly traded firms. We experienced an extremely good response rate, although, given the size of the Swedish economy, the absolute number of respondents was low, which limits our ability to draw conclusions from specific industries and about differences between companies in different size categories.

Although Hypothesis 1b is not supported in total, the significant effect of Dynamic Capabilities on Performance Results of TC implementation does establish the validity of the underlying concept that Dynamic Capabilities are potentially important for understanding Target Costing.

Our study partly supports the Prieto et al. (2009) operationalization in the Swedish context. Most of the variables have adequate Cronbach's alphas, indicating that they were internally consistent. This provides support for the existence of the Dynamic Capabilities operationalization. Two of the Prieto et al. (2009) sub-scales of Dynamic Capabilities had a low Chronbach's alpha indicating a lack of internal consistency. The main Dynamic Capability variable had an adequate level. However we do not find significant relationships between all the DC and TC variables that would fully support the Prieto et al. (2009) operationalization of the DC concepts in relation to Target Costing. Prieto et al. (2009) experienced the same pattern of results we did with the variables related to Dynamic Capabilities, although to a lesser degree. Their Cronbach's alphas for the DC sub-scales followed the same pattern as in the present study, with the Knowledge Integration and Knowledge Re-creation scales being less reliable than the Knowledge Generation sub-scale, or the overall scale. We do find support for the Dynamic Capabilities main scale and Performance Results, however not for the other TC variables.

The fact that we do not find pervasive relationships is surprising. Both of the concepts, Dynamic Capabilities as well as TC, are very well established. On the other hand, operationalizing the variables that define the two concepts is not as clear. This result leads us to question the operationalization of the Dynamic Capabilities concepts. The Swedish organizational context is different from the Spanish and it appears that the operationalization of the Dynamic Capabilities concepts does not fit as well in the Swedish context.

Reflecting on these results leads to consideration of two issues: organizational assumptions in the development of the underlying DC concepts; and, operationalization of the concepts.

First, there may be path dependent aspects to the development of the DC concepts that reduce its robustness to different organizational and national contexts. Specifically, the underlying concepts of new product development

as explicated in the western academic and professional literature may not be aligned with the TC approach to product design, which is anchored in Japanese practices. Upon observation, the items in the Dynamic Capabilities scales appear to be aligned with an underlying concept that effective product design is, in effect, a disruptive activity, and that effective new products are "game changers". While having a game changing product may be the goal of young product designers and academics, the majority of new product development activity is the careful refinement of existing elements based on knowledge of customer needs, combined with knowing which aspects of those needs the organization is capable of satisfying. Both of these aspects imply long experience. To the extent that new knowledge is used, it is actually only new to the designer, but normally well established and well understood elsewhere. This type of "accumulated expertise" design is almost totally dominant in the TC environment. In particular, the primary TC tools such as Value Engineering and Quality Function Deployment (QFD) are mainly useful for the refinement process and much less effective for aspects of the design where the designer has no experience with either the customer's needs or the organization's capacity to deliver.

This observation extends to the entire DC framework. The elements of the DC framework see learning and knowledge management as arising from an essentially chaotic base, and leading to dramatic and decisive changes. An alternate view that knowledge is the product of a slow and carefully accumulated process of discussion among peers does not seem to have been used in the development of the DC concepts, which took place mainly in the west. However we do have examples of such alternate knowledge development platforms. The stereotypical Japanese, Swedish and Lean organizational philosophies all rely, at some level, on the accumulation and sharing of knowledge such that the concepts of Knowledge Integration or Knowledge Re-creation might not appear as discrete processes. In this case the traditional western form of the DC model may not explain the TC process. In other words there may be path dependence in the development of the DC concepts that presume some sort of underlying fractured knowledge system.

On the other hand the issue we face in this study may be the more simple issue of operationalization of the DC concepts. It is noted that these concepts are not often concretized (Pavlou & El Sawy, 2004). In either case, additional

research is needed to develop a more robust way to measure DC that can handle different environments. An important part of developing better measures of the DC concepts is qualitative research in different contexts to better understand the underlying relations inherent in DC and how it potentially can influence the use of TC and similar techniques. We need both a more extensive evaluation of the DC concept as well as more cross cultural study in order to develop more robust measures of dynamic capabilities.

We identify a relationship between Dynamic Capabilities and Performance Results from implementing Target Costing; however the relationship is not complete. As a result we suggest that traditional approaches to Dynamic Capabilities do not adequately explain the impact of TC in Organisations with different internal practices such as, in our case, the Swedish approach. We suggest an avenue to explore this empirical result and point out the need for a more robust development of the Dynamic Capabilities concepts.

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APPENDIX A

Questionnaire on Target Costing Implementation and Dynamic Capabilities

I. About your Company

Industry type: food____ textile_____ publishing/paper_____ chemical/ pharmaceuticals_____ rubber____ steel___ fabricated metals_____ electrical/electronics _____ transportation equipment____ precision equipment_____ instruments/optical ____ finance_____ insurance_____ other services_____

Products/services sold to industrial customers_____ consumers__ both ___
Total average revenue of the past 3 years (2009 – 2011) _____
Total average number of employees in 2010-2011 _____
Average profit margin in 2009-2011 _____

II. Background information about target costing implementation

(Please write your response or place an '√' mark in the appropriate place(s).)

Chose the option that defines how the company manage the process of new product development: (check one of the options below):
All projects are developed inside the company _____
The majority of the projects are developed inside the company _____
Fifty percent of the projects are developed inside the company _____
The majority of the projects are developed outside the company _____
All the projects are developed outside the company _____
Do you practice target costing in your company? Yes_____ No____
Do you practice target costing only on new product development?
Yes _____ No _____
If your reply is "no", please briefly explain how target costing is practiced in your company.
Which of the following departments are involved in the Target costing process? (Please check all of the following that apply)

Yes No

Product development
Product design
Purchasing
Manufacturing
Marketing
Sales
Product planning
Finance/accounting

When you apply a target costing methodology in your company, which of the following stages of new product development is involved: (check the appropriate boxes)

	Idea stage	Planning stage	Development stage	Design for production stage	Production stage
Yes	1	1	1	1	1
No	0	0	0	0	0

What are the goals of implementing target costing? (check all that are seriously and explicitly considered)

Yes No

Achieve budgeted profit
Achieve a high product quality
Fulfill customer satisfaction
Achieve a fast product introduction
Costs Planning
Achieve low cost
Target a set selling price
All of the above

To what extent where the following achieved?

Outcome	Cannot tell	No benefit	Little benefit	Some benefit	Significant benefit
Achieve budgeted profit					
Achieve a high product quality					
Fulfill customer satisfaction					
Achieve a fast product introduction					
Costs Planning					
Achieve low cost					
Target a set selling price					

When the cost reduction has been identified cost can be reduced either within the company or through cost reduction in collaboration with the suppliers. In your company what percentage of the cost reduction do you achieve within the company? ____ %

Target costing is implemented:
Company-wide _____
Entire plant _____
Specific division(s) _____
Specific product(s)/service _____

How long have you been using target costing? _____ years
How many employees are involved in target costing activities? _____ persons
Do you have a separate department for target costing implementation?
Yes_____, What is the name_____ No_____

If yes, the department belongs to:
Headquarters _____
Plant _____
Other (please specify.) _____

Detailed allocation of the target cost is done to the following level(s):
(check all that apply)

	Yes	No
Each component		
Each project		
Each division/department		
No detailed allocation		

Performance evaluation on target costing is conducted at the following level(s):
(check all that apply)

	Yes	No
Each component		
Each project		
Each division/department		
No evaluation		

Is information on target costing performance sent to the design engineers?
Yes ____ No ____

III. Dysfunctional Behaviors

The four questions in the table deal with dysfunctional behaviors that can arise in implementing target costing. For each question, please circle an appropriate number on the five-point scale. You may make additional comments below.

	Tell us how often the following occur:	Never	Rarely	Occasionally	Frequently	Always
1	Burnout of suppliers due to the excessive demand of cost reduction	1	2	3	4	5
2	Increasing conflict among the departments	1	2	3	4	5
3	Burnout of design engineers due to strict targets	1	2	3	4	5
4	Too much emphasis on customer orientation (e.g., diversified products)	1	2	3	4	5

Comments:

IV. Performance Results

The questions in the table concern performance results that can arise from implementing target costing. For each question, please **circle** an appropriate number on the five-point scale. You may make additional comments below.

	The following results can be identified:	Never	Rarely	Occasionally	Frequently	Always	Don't know
1	Realization of product concept	1	2	3	4	5	0
2	Quality improvement	1	2	3	4	5	0
3	Product cost reduction	1	2	3	4	5	0
4	Reducing development lead time	1	2	3	4	5	0
5	Product features based on customers' needs	1	2	3	4	5	0
6	Timely introduction of new product	1	2	3	4	5	0
7	Waste reduction on the factory floor	1	2	3	4	5	0
8	Active involvement of all departments	1	2	3	4	5	0
9	Improving design/ development technology	1	2	3	4	5	0
10	Connection between design and cost is seen more clearly	1	2	3	4	5	0
11	Strengthening design/ development process	1	2	3	4	5	0
12	Cost reduction efforts by engineers	1	2	3	4	5	0
13	Reduction of raw materials purchased	1	2	3	4	5	0
14	Reducing design changes after the start of production	1	2	3	4	5	0
15	Upstream cost reduction	1	2	3	4	5	0

Comments:

V. Success Factors

The table below lists the factors that are important in implementing target costing successfully. For each factor, please **circle** an appropriate number on the five-point scale. You may make additional comments below.

		Not important at all	Of little important	Somewhat importance	Very important
1	Top management support	1	2	4	5
2	Tools and information system	1	2	4	5
3	Cooperation with suppliers	1	2	4	5
4	Cooperation with other departments	1	2	4	5
5	Empowered project manager	1	2	4	5
6	Cost estimation capability	1	2	4	5
7	Concurrent engineering	1	2	4	5
8	Cross-functional team (org. structure)	1	2	4	5
9	Cross-functional transfer of employees	1	2	4	5
10	Job rotation	1	2	4	5
11	Information sharing	1	2	4	5
12	Autonomy of employees	1	2	4	5
13	Delegation of power/responsibility	1	2	4	5
14	Linkage to profit planning	1	2	4	5
15	New technology/materials from R&D	1	2	4	5
16	Technology in production/quality	1	2	4	5
17	Functional knowledge of team members	1	2	4	5
18	Knowledge about cost	1	2	4	5

Comments:

VI. Dynamic Capabilities

Please **circle** an appropriate number on the five-point scale. You may make additional comments below.

	In this organization:	Never	Rarely	Occasionally	Frequently	Always
KG 1	Product development (PD) membersproduce many new novel and useful ideas	1	2	3	4	5
KG 2	PD members do an outstanding job uncoveringproduct problem areas with which customer were dissatisfied	1	2	3	4	5
KG 3	PD members do an outstanding job correcting product problem areas with which customer were dissatisfied	1	2	3	4	5
KG 4	PD members incorporate new knowledge, methods and inventions	1	2	3	4	5
KI 1	PD members integrate new and existing ways of doing things without stifling their efficiency	1	2	3	4	5
KI 2	PD members apply lessons learned in other areas of the organization	1	2	3	4	5
KI 3	PD members use existing (technical and market) competences related to products/services that are currently being offered	1	2	3	4	5
KI 4	PD members are able to identify valuable knowledge elements, connect, and combine them	1	2	3	4	5
KC 1	PD members introduce perceptible changes that lie outside the existing features of existing products/services	1	2	3	4	5

KC 2	PD members reconfigure the networks of relations and communication relationships both within and outside the firm	1	2	3	4	5
KC 3	PD members transfer knowledge from the PD team to the whole organization.	1	2	3	4	5
KC 4	PD members are able to replace outdated knowledge	1	2	3	4	5

Comments: