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Measuring Sustained Competitive Advantage From Resource-based View: Survey of Chinese Clothing Industry

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Abstract

The resource-based view of the firm (RBV) argues that valuable, rare, inimitable, and non-substitutable resources are the source of a firm's sustained competitive advantage (SCA); this contention has been tested in an increasing number of studies. However, the extant empirical literature emphasizes the significance of resources and capabilities (R&Cs) played and few studies focus on SCA, the other end of the RBV logic. Therefore, this study aims to address this deficiency by focusing on the measurement of SCA. Further, SCA is traditionally measured by financial performance in the empirical studies, which is not only inconsistent with the theory but also proves to be practically difficult in access to the data. However, this paper argues that process performance is more appropriate to measure SCA and this theoretical idea is examined with the survey data collected in 2011/2012 using 209 valid responses from participants in the Chinese clothing companies. Structural equation modeling (SEM) was adopted to test hypothesized relationships between the endogenous construct of process performance and three exogenous constructs measuring R&Cs. The results suggest that process performance is an appropriate and effective method measuring SCA in terms of good construct validity and of consistency with the RBV expectations.

Keywords: performance measurement, resource-based view, sustained competitive advantage, structural equation modeling, Chinese clothing industry

1. Introduction

A growing literature has contributed to empirical testing of RBV theory since the 1990s. Generally, the empirical literature tests the relationship between R&Cs (i.e., the predictor variable) and organizational performance (i.e., the dependent variable). However, the empirical studies vary in support for RBV, which in itself may be a consequence of methodological choices related to different variables and the relevant operationalization of such chosen variables (Newbert, 2007; Armstrong & Shimizu, 2007).

Moreover, most existing statistical tests of the theory have focused on identifying and operationalizing the predictor variable of R&Cs while the dependent variable, SCA, has rarely been explored. Further, SCA is traditionally measured by financial performance in the empirical studies, which is not only inconsistent with the theory but also proves to be practically difficult in access to the data. Therefore, this study aims to fill this gap and to find out practical and effective measurement of SCA through both theoretical investigation and empirical test. In doing so, the paper contributes and adds to the empirical research on RBV.

Motivation for this study comes from Ray, Barney, and Muhanna (2004). The authors pay specific attention to the issue of SCA measures. They argue that process performance as a dependent variable is a more appropriate measure to test the resource-based logic than the overall performance of the firm. This theoretical idea is then developed accordingly, commencing from the position that an aggregated dependent variable of firm performance may lead to misleading conclusions as the variable will not reflect the constituent elements comprising the source of the firm's advantages. Furthermore, the authors argue that financial performance may be understated especially when a firm's stakeholders are appropriating potential profits from the business prior to the firm's published results. Finally, they argue that business process itself is the source of SCA when it exploits

R&Cs with VRIN attributes (V stands for value, R for rareness, I for inimitability, and N for non-substitutability) (Barney, 1991).

However, the above theoretical argument has seldom gained empirical testing. Therefore, motivated by the business process performance argument as the key independent variable, this study intends to undertake further investigation on measures and measurement of SCA and also empirically to test this theoretical idea within a specific research context, namely the Chinese clothing industry.

China is the world's largest clothing manufacturer and exporter. The Chinese clothing industry has gradually integrated into the clothing global value chain (GVC) since the 1990s. However, the competitive advantage of the Chinese clothing industry is currently increasingly challenged mainly due to rising production costs and intensified global competition in the low value-added manufacturing sector. The clothing industry, as one of the most globalized industries, is typically characterized with high labor intensiveness and globally dispersed production (Dicken, 2011). Global clothing production has witnessed a constant shifting towards low-cost economies throughout its history. Currently, the Chinese clothing manufacturers are facing a crucial development phase in terms of SCA, particularly due to the 2008 financial crisis and the global economic recession that followed.

This SCA issue of the Chinese clothing industry provides the research background to this study and the source of the empirical data as well. We develop our discussion of measuring SCA in two steps. At the first step, via literature study we explore SCA measures and measurement and develop the conceptual research model as well. The second step is to test the measurement within the hypothesized model using the data collected from the Chinese clothing industry.

Following this introduction, the rest of the paper is structured as follows. The next section reviews the relevant literature on the measures and measurement of SCA. The third section highlights the research model, including the measurement framework, hypotheses, and structural model. The fourth section introduces the research methods including sampling, survey instrument, and data. The fifth section presents the statistical results. The last section comes to conclusion and discussion. Contributions, limitations and future research are also provided in this section.

2. Literature Review

This paper assumes that an appropriate and effective measure should be consistent with the relevant concepts and theoretical underpinnings and this is a premise for this research to develop and test the measure of SCA.

2.1 Defining SCA

According to RBV, a competitive advantage is defined as the benefits a firm gains "when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors" (Barney, 1991). The author further argues that the competitive advantage is sustained before it dies away due to the duplication of the value creating strategy by other firms. Therefore, the concept of SCA in the context of RBV does not refer to how long a period a competitive advantage can last, though it does imply relatively longer time. Rather, whether or not a competitive advantage is sustained depends upon the possibility of competitive duplication. SCA is reflected in the forms of better performance compared to a benchmark of some or all of its rivals (Wernerfelt, 1984; Peteraf, 1993; Teece, Pisano, & Shuen, 1997; Barney, 1991). Business performance is embedded in the effectiveness and efficiency in terms of better quality, reduction of costs, exploitation of market opportunities, and/or neutralization of competitive threats (Barney, 1991).

This definition and interpretation of SCA is quite comparable to the business performance measurement system (BPMS). According to BPMS, business performance is defined as efficiency and effectiveness of actions and business performance measurement system as the set of metrics used to quantify both the efficiency and effectiveness of actions (Neely, Gregory, & Platts, 1996; Bititci, Carrie, & McDevitt, 1997). For instance, in a situation of providing services to customers, effectiveness refers to the extent to which customer requirements are met and therefore may be better measured using *non-financial indicators*, while efficiency refers to how economically the firm's resources are utilized when providing a given level of customer satisfaction and is therefore appropriately measured using *financial indicators* (Bititci et al., 2011). Therefore, BPMS provides a large picture to refer to for measurement of SCA.

2.2 Measuring SCA

Business performance management system (BPMS) is a topic of long and increasing concern to both academics and practitioners but it is complicated due to its multi-dimensional nature. Through meta-analysis of the relevant literature, Garengo, Biazzo, and Bititci (2005) summarize the main dimensions of an effective BPMS design

(Note 1). The authors then use the dimensions as a checklist to examine the main BPMS models developed since the mid 1980s (Note 2). The results suggest process performance is increasingly presented in the latest models, which implies the process performance measure, relatively neglected in the past, now is at least the same important with, if not superior to, the financial performance measure in the business performance measures. For example, in the Integrated Performance Measurement Model (Bititci et al., 1997), process performance is one of the four levels (i.e., corporate, business, *processes*, and activities); in the Performance Prism Model (Lynch & Cross, 1991), there are three "prisms", namely, stakeholders' satisfaction, *processes*, and capabilities.

2.2.1 Financial Performance Measure

Traditionally, profitability indicators of financial performance, such as return on assets (ROA), return on investment (ROI), and return on sales (ROS), have been widely used in the empirical literature (e.g., Bharadwaj, 2000; Zhu, 2004; Zhang, 2007). Sales, sales change, market share, and market share change are also included in the financial performance indicators (e.g., Powell & Dent-Micallef, 1997; Zhu, 2004; Wiklund & Shepherd, 2009). However, it is criticized that financial performance may not give an appropriate measure of SCA due to inconsistencies with the RBV theory. *Firstly*, this measure implies the assumption that superior financial performance generates SCA. However, Powell (2001) argues that competitive advantage leads to the improved financial performance but not the reverse. *Secondly*, RBV emphasizes heterogeneity of resources and their contribution to SCA. Using financial performance to measure SCA is based on mean contribution from common firm R&Cs, which statistically neutralizes resource heterogeneity and neglects the theory fundamental element of the theory, namely the attribute of rareness in individual firm's resources (Hansen, Perry, & Reese, 2004). *Thirdly*, simply examining the relationship between a firm's R&Cs and its overall financial performance may lead to misleading conclusions on some occasions (Ray et al., 2004). For example, when a firm has competitive advantage in some R&Cs and competitive disadvantage in others, examining the relationship between the firm's different R&Cs and the overall financial performance can lead to biased conclusions. Another case may be that a firm may possess resources that have the potential for generating competitive advantage but have not been fully realized into overall financial performance through its businesses activities.

2.2.2 Process Performance Measure

Process performance provides an alternative to the financial performance measure and can be a more appropriate way to measure SCA (Ray et al., 2004). At least two rationales support this argument. One is that the process performance measure conforms to the underpinnings of RBV and thus enables researchers to avoid those drawbacks associated with the financial performance measure, which has been discussed earlier. The other reason is that multiple business processes themselves are a source of SCA and therefore process performance is the direct measure of SCA (Barney, 1991).

There are three main classifications of business processes: managerial process, operational process, and supportive process. Among them it is suggested that operational and supportive processes deliver performance while managerial processes sustain performance in the future (Bititci et al., 2011). Operational processes are processes that constitute the core business, e.g., getting order, manufacturing product, marketing and sales service. Supportive processes provide support to the core processes, e.g., personnel support, technical support, and facilities, etc. Managerial processes are the processes that govern operation of a system, e.g., setting direction, managing strategy, building organizational competence, managing performance, and managing change. Therefore, operationalizing process performance needs to take into consideration of balance among the different classifications.

3. Research Model

3.1 Measurement Framework

Following Churchill's (1979) paradigm, the whole measurement framework consists of 4 constructs which are represented by 15 indicators (Appendix 1) (Note 3). SCA is measured by the construct of process performance (PP) and this measure is grounded in the synthesized theories of RBV and BPMS, which has been discussed so far. R&Cs is measured by three conceptual constructs, namely, fundamental resource (FR), dynamic capability (DC), and upgrading capability (UC). There is no reference in the existing literature to measure the holistic R&Cs. As a try but drawn from RBV theory, the three conceptual constructs measuring R&Cs are originally formulated for this study. Among them FR is the survival and fundamental dimension which generates competitive parity; UC is an urgent and strategic dimension which is required for updating the original competitive advantage for SCA (Humphrey & Schmitz, 2000; Bair & Gereffi, 2003); given external dynamics, dynamic capability (DC) is required to reconfigure the exiting R&Cs so as to adjust to the external dynamics for SCA (Teece at al., 1997; Eisenhardt & Martin, 2000).

Process performance (PP) is operationalized as 5 indicators (Appendix 1), namely, order acquisition (Bititci 2011), external communication (C. Lee, K. Lee, & Pennin, 2001; Bititci et al., 2011), internal cohesion (Lee et al., 2001; Bititci et al., 2011), strategic adaptability (Wu, 2010), and cost control (Zhu, 2004). There is no widely accepted criterion to refer to for the selection of indicators of process performance. Selection of the 5 indicators in this study is based on two considerations, namely, business process (i.e., attribute and classification) and the research context (i.e., the Chinese clothing industry). In business process, operational process (represented by order acquisition and external communication) and supportive process (represented by internal cohesion and cost control) deliver performance while managerial process (represented by strategic adaptability) sustains performance (Bititci et al., 2011). Concerning the research background, current competitive advantage of the Chinese clothing industry is challenged by rising costs (hence indicator of cost control), intensified competition (hence indicator of order acquisition), and increasing external dynamics over the latest years (hence indicator of strategic adaptability), which also require for integration of both internal and external resources and for adjustment to the external market changes (hence indicators of external communication and internal cohesion).

Fundamental Resource (FR) refers to the R&Cs which "can help ensure a firm's survival when they are exploited to create competitive parity in an industry" (Barney, 1989). There are a variety of the FR indicators highlighted in the RBV literature, e.g., quality control, firm-specific labor, customer loyalty, capital, and machinery (Barney 1989; Dierickx & Cool, 1989) yet there is no one agreed criterion for selection. Based on the research background, the conceptual construct of FR in this study is operationalized as 4 representatives variables (Appendix 1), namely, customer relationship (Boyd, Bergh, & Ketchen, 2010), supplier relationship (Bonaccorsi & Lipparini, 1994; Koufteros, Vonderembse, & Doll, 2002), skillful worker (Wernerfelt, 1984; Barney, 1991), and quality control (Powell, 1995; Tuan & Yoshi, 2010). Stable quality control is a general and fundamental requirement for the company to survive in the competitive market and skillful worker is particularly required in the current Chinese clothing manufacturing companies due to shortage of skillful workers in addition to rising labor costs. Most Chinese clothing companies manufacture quite homogenous products with similar inputs and also clothing is consumer goods. In this context, customer relationship is fundamental for survival. For similar reasons, supplier relationship is also required for the stable and timely supply.

Dynamic capability (DC) is defined as "the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments" (Teece et al., 1997). DC is also about the organizational process which enables organizations to address rapidly changing environments and to renew and reconfigure R&Cs so as to achieve SCA (Eisenhardt & Martin, 2000). During the organizational process, information about external market dynamics could be accessed through organizational learning. Concurrently, quick response to the dynamics requires the company involved to effectively make and implement appropriate decisions, for example, about which new resource or capability should be developed or acquired. Both entrepreneurship and human resource management (HRM) are key elements for the decision making and the following-up implementation process. Entrepreneurship motivates effective communication and facilitates innovative decisions whilst strong and effective HRM ensures coherence of the organization's aim with maximized personal development of its employees, which ensures the effective implementation of the decisions. Based on these insights, the construct of DC in this research is operationalized as four indicators (Appendix 1), namely, HRM (Amit & Belcourt, 1999; Chadwick & Dabu, 2009), organizational learning (De Geus, 1988; Crossan & Berdrow, 2003), quick response (Womack & Jones, 2005; Lewis, 2000), and entrepreneurship (Simon, 2010).

Upgrading capability (UC) enables a firm to move to more profitable and/or technologically sophisticated capital- intensive or skill-intensive economic niches (Gereffi, 1999). According to the fieldwork, functional upgrading (e.g., branding) and technology upgrading (e.g., information technology) are the two most discussed and practiced solutions for SCA in the current Chinese clothing industry. Functional upgrading can be defined as sequential role shifts, and these shifts follow the trajectory of export-oriented assembly (OEA), original equipment manufacturer (OEM), original design manufacturer (ODM), to original branding manufacturer (OBM) (Humphrey & Schmitz, 2001; Gereffi, Humphrey, Kaplinsky, & Sturgeon, 2001). Functional upgrading for the majority of the Chinese clothing companies is to move towards the branding stage. Branding contributes to diversity and individuality which enables the clothing company to transform and upgrade the present competitive advantage pattern based on low prices and homogenous products. Information technology contributes to more effective and more efficient production by coordination and communication among the value chain activities, e.g., design, supply, production, inventory, sales, and distribution. Thus based on the above insights, the construct of UC in this research is operationalized as two measured variables (Appendix 1), namely, branding (Aaker, 1989; Keller, 2009) and information technology (Mata, Fuerst, & Barney, 1995; Powell & Dent-Micallef, 1997).

3.2 Structural Model and Hypotheses

The structural model and corresponding hypotheses (Figure 1) are formulated upon the theoretical underpinnings of RBV (Wernerfelt, 1984; Barney, 1991; Dierickx & Cool, 1989; Peteraf, 1993; Prahalad & Hamel, 1990; Teece et al., 1997). RBV explores how firm-specific R&Cs may achieve and sustain competitive advantage (Amit & Schoemaker, 1993; Teece at al., 1997; Lockett, Thompson, & Morgenstern, 2009). According to the theory, R&Cs with the VRIN attributes are a source of SCA , where the "value" comes from improved efficiency and effectiveness in terms of lower cost, neutralized competition, or/and enhanced benefits; the "rareness" attribute ensures a value creating strategy not simultaneously being implemented by any current or potential competitor; the "inimitability" and "non-substitutability" result from one or more of three reasons - history, causal ambiguity, and social complexity - and those attributes ensure that a firm's competitive advantage will not be replicated or replaced by the other firms so as to be sustained (Barney, 1991).

In theory, the VRIN R&Cs are assumed to contribute to SCA in the bundling form. Bundling refers to correlation and integration of the various R&Cs that make it extremely difficult for competitors to imitate them, which underpins SCA (Powell, 1995). Thus it is generally accepted that a specific or single resource is insufficient to create SCA but instead it is combined or bundled resources generate SCA (Ray et al., 2004; Wiklund & Sheperd, 2009). In this study, the VRIN R&Cs are measured by three constructs, i.e., fundamental resource, dynamic capability, and upgrading capability, and they are hypothesized as follows (Figure 1).

H_1: Fundamental resource and dynamic capability are significantly and positively correlated

H_2: Fundamental resource and upgrading capability are significantly and positively correlated

H_3: Dynamic capability and upgrading capability are significantly and positively correlated

As discussed above, FR is the survival dimension of R&Cs and can be viewed as a prerequisite for competitive advantage. Therefore, FR is assumed to be positively and significantly related to SCA (Barney, 1989).

According to the theory, fundamental resource is a source of SCA in the static situation. However, business situation is rarely static but challenged by the external dynamics. Therefore, given dynamic environments, SCA is conditional upon a firm's dynamic capability as it enables the firm to sustain its competitive advantage attained by renewing and reconfiguring R&Cs (Teece et al., 1997; Eisenhardt & Martin, 2000; Teece, 2007).

China is the world largest clothing manufacturer and exporter. The Chinese clothing industry is now challenged by both domestic rising costs and global competitors, e.g., India, Turkey, Bangladesh, and Vietnam, to list a few. The intensified global competition is particularly in the labor-intensive and non-brand manufacturing sector, where over-production of homogenous products without brands inevitably results in competition based on low price and low added value. Therefore functional upgrading via branding or/and technology leads to higher value-added ends with diversity and heterogeneity, which is a practical way to avoid the competitive advantage trap in the low value-added manufacturing sector so as to achieve SCA. Hence in the present situation, upgrading capability is a strategic and critical source for SCA of the Chinese clothing companies (Gereffi, 1996; Bair & Gereffi, 2003; Kaplinsky, 2000).

In the earlier discussion, process performance measures SCA while fundamental resource, upgrading capability, and dynamic capability measure R&Cs in three dimensions. Based on the theoretical assertions of RBV, three more hypotheses are formulated to specify the dependence relationships between R&Cs and SCA as follows (Figure 1).

H_4: Fundamental resource is significantly and positively related to process performance

H_5: Dynamic capability is significantly and positively related to process performance

H_6: Upgrading capability is significantly and positively related to process performance

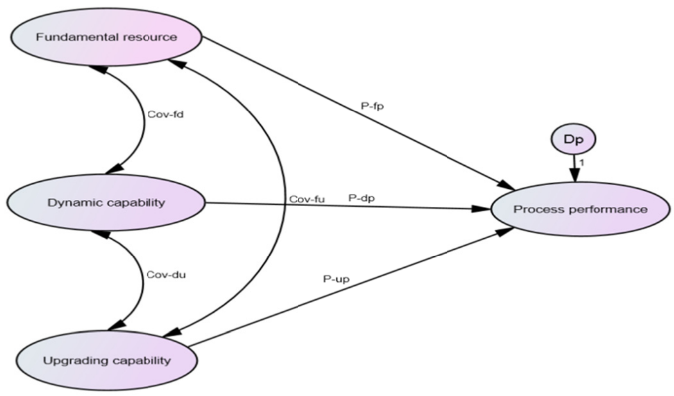

Figure 1. Structural model for test of the SCA measure

Notations: In the diagram, the hypothesized causal relationships are depicted in straight lines with single-headed arrows from exogenous construct to endogenous construct while correlations depicted with double-arrow curves between two exogenous constructs. As a result, 3 path parameters are to be estimated together with 3 construct covariances or correlations. Dependence relationship is notated by “P” (path coefficients) while notation “Cov” expresses covariance or correlation. Endogenous construct of process performance also links to a disturbance variance (noted by “D”), representing extant of inability to be fully explained by the exogenous constructs within the model.

4. Research methods

4.1 Sampling and Data Collection

Taking consideration of representativeness, feasibility, cost, and time, this study defines two sampling criteria, i.e., location and size. The sample companies are distributed throughout 13 cities in Zhejiang province of China, where the major source of the clothing manufacturers and exporters is located. The selected clothing companies are above the designated size with annual revenue over 5 million RMB from the principal business and this size criterion is in line with the National Bureau of Statistics of China.

Contact information of the sample was obtained from two sources, Zhejiang Garment Industry Association and Zhejiang Administration for Industry & Commerce. Data collection lasted 5 months from November 2011 to March 2012. As a result, a total 209 of valid replies were obtained. Among them 158 copies (about 76%) were delivered via interviews and the rest 51 copies (about 24%) via email. 180 responses were from 6 major clothing cities in Zhejiang province, namely, Hangzhou (30), Ningbo (30), Wenzhou (30), Shaoxing (30), Yiwu (30), and Zhuji (30). The remaining 29 responses were from other 7 cities, namely Huzhou, Jiaxing, Cixi, Jinghua, Lishui, Taizhou, and Haining.

4.2 Data and Scale

The 7-point Likert scale is used for questionnaire items and scores of the items are based on respondents' attitudes towards these statements, ranging from “1”, which indicates strongest disagreement, to “7”, which indicates strongest agreement. Table 1 presents descriptive statistics in terms of mean, standard deviation (s.d.), and distribution frequency.

Table 1. Descriptive statistics of the indicators of R&Cs and process performance

			Distribution frequency in percentage						
Indicator	mean	s. d.	1=strongly disagree	2=disagree	3=slightly disagree	4=neutral	5=slightly agree	6=agree	7=strongly agree
Indicator of resources and capabilities (R&Cs):									
Skillful worker	5.74	1.196	0.5	0.5	3.7	10.5	22.4	29.7	32.9
Information technology	5.04	1.328	0.5	1.4	10.0	26.0	22.8	22.4	16.9
Customer relationship	5.79	1.194	0.0	0.5	4.1	12.8	16.4	31.5	34.7
Supplier relationship	5.71	1.124	0.0	0.9	1.8	11.9	26.0	29.7	29.7
Human resource management	5.26	1.284	0.5	0.5	10.0	17.4	23.3	30.6	17.8
Quick response	5.75	1.272	1.4	0.9	2.7	9.1	22.4	28.8	34.7
Quality control	5.91	1.084	0.0	0.5	1.8	8.7	21.9	29.7	37.4
Branding	4.58	1.541	4.6	5.0	17.8	12.3	28.3	25.1	6.8
Organizational learning	5.17	1.240	0.0	1.4	8.7	19.6	27.4	27.4	15.5
Entrepreneurship	5.34	1.316	0.9	1.8	5.9	15.5	26.5	27.9	21.5
Indicator of process performance (PP):									
Strategic adaptability	5.30	1.289	0.5	2.3	4.6	18.3	30.1	22.4	21.9
Order acquisition	5.35	1.302	0.5	1.8	7.3	15.1	24.2	30.6	20.5
Cost control	5.20	1.209	0.9	.5	5.9	21.5	26.9	30.6	13.7
External communication	5.47	1.201	0.0	1.4	3.7	15.5	29.7	25.1	24.7
Internal cohesion	5.58	1.240	1.4	0.5	4.1	9.6	27.9	30.6	26.0

Distributions of these sample variables are all skewed slightly in the negative direction with the means over average scores (M > 4) indicating that majority of respondents hold positive attitudes towards the significance of these R&Cs for SCA and also toward the firms' process performance over recent years. Among the 10 R&Cs variables, the greatest mean (M=5.91) with least standard deviation (s.d.=1.084) is quality control indicating that it confirms as the most significant resource underpinning SCA. Another three variables, namely, customer relationship (m=5.79, s.d.=1.194), quick response (m=5.75, s.d.=1.274), and skillful worker (m=5.74, s.d.=1.196), achieved similarly higher mean scores with relatively lower standard deviations again implying similar conclusions as with quality control. In contrast, but interestingly, branding has the lowest mean (M=4.58) with the highest standard deviation (s.d.=1.541). In comparison, the five process performance indicators have much similar distribution frequencies (the means ranging from 5.20 to 5.58 and the standard deviations ranging from 1.201 to 1.240).

5. Results

Following the two-step approach of data analysis (Anderson & Gerbing, 1988), the measurement model is first assessed to validate the constructs prior to test of the structural model and the hypotheses. Due to space limitation this paper only presents part of the results, i.e., convergence validity and model fit indexes (selected).

5.1 Measurement Model

The results of the measurement model fit indices (selected) suggest good fit (Table 2). The chi-square (χ^2= 158.243 with 84 degrees of freedom) at the 0.001 significant level suggests the null hypothesis of the perfect model is rejected. However, considering the large sample size (N=209) and the complexity of the model (e.g., the number of observed variables =15), even a significant ρ-value suggests good fit (Hair, Black, Babin, & Anderson, 2010). The normed chi-square (i.e., CUMIN/DF=1.884) is between 1 and 2, which is considered very good fit. The CFI (.952) exceeds .95 and the GFI (.906) exceeds .90, both indicating good fit. RMSEA (.065 with 90% confident interval between .49 and .81) is less than the suggested cutoff value of .08, which also suggests good fit.

Table 2. Goodness-of-fit statistics with guidelines

Measurement model (N*=209, m=15)	**Structural model (N=209, m=15)**	**Guidelines of good fit** (Hair et al., 2010)**(N<250, 12<m*<30)**
Chi-square (χ^2):		
CUMIN= 158.243 (ρ= .000)	CUMIN= 158.243 (ρ= .000)	Significant ρ-values even with a good fit
DF= 84	DF= 84	
Absolute fit measures:		
GFI= 0.906	GFI= 0.906	GFI≥0.9
RMSEA = 0.065 (.049-.081)	RMSEA = 0.065 (.049 - .081)	RMSEA≤0.08 with CFI≥0.95
RMR=0.066	RMR=0.066	--
CUMIN/DF= 1.884	CUMIN/DF= 1.884	Normed fit between 1 and 2
Baseline fit indices		
NFI=0.908	NFI=0.904	--
CFI=0.957	CFI=0.952	CFI ≥0.95
Parsimony fit indices		
PRATIO=0.800	PRATIO=0 .800	--
PNFI=0.723	PNFI=0.723	--

*Note: "N" denotes the sample size and "m" denotes the number of observed variables.

Convergence validity and discriminant validity are two main indices representing extent of construct validity. Convergence validity is estimated in this paper by examining factor loadings, average variance extracted (AVE), and construct reliability (CR) (Appendix 2) (Kline, 2005; Hair, et al., 2010). The five standard loadings for the construct "process performance" are all ideally over .7 and loadings for the rest range from .609 to .836. All the loading estimates are statistically significant. All the four AVE values are greater than .05, which also suggests a good measurement convergence. CR values are supportive for the subsequent analysis. Discriminant validity is assessed by examining correlations between the four constructs. All the estimated correlations (i.e., ranging from .649 to .818) are not excessively high (e.g., > 0.85) (Appendix 3), which indicates supportive discriminant validity (Kline, 2005:73).

In summary, the assessment results of the measurement model suggest that the model fit is good and that construct validity is also generally supported for the subsequent analysis of structural model.

5.2 Structural Model

To this same dataset used in the preceding measurement model, a converged solution is obtained for the proposed structural model. The model fit indices (selected) with the guidelines are shown in Table 2. In comparison with the measurement model, there is no substantial change in the selected fit indices. Only a slight change occurs in baseline fit indices, e.g., the CFI (from .957 down to .952), which is still better than the guideline (i.e., .950). All indices suggest good model fit, which is adequate for the next test of hypotheses.

Table 3. Structural parameter estimates

Hypothesized relationship	Unstandardized parameter estimate	S.E.	t-value	P	Conclusion of results
H_1: FR↔DC	.549	.086	6.421	***	Yes
H_2: FR↔UC	.435	.084	5.170	***	Yes
H_3: UC↔DC	.666	.122	5.441	***	Yes
H_4: FR→PP	.350	.176	1.996	.046*	Yes
H_5: DC→PP	.195	.207	.942	.346	No
H_6: UC→PP	.311	.139	2.237	.025*	Yes

Notes: *** stands for statistical significance at the 0.001 level (two-tailed) and * for statistical significance at the 0.05 level; "→" represents causal relationship and "↔" denotes covariance or correlation.

Table 3 show unstandardized parameter estimates. Five out the six hypotheses are supported, including the three hypothesized covariances (i.e., H_1, H_2, and H_3,), which are all statistically significant at the 0.001 level, and two of the three casual relationships (i.e., H_4 and H_6), which are statistically significant at the .05 level ($t > 1.960$ for a two-tailed test). However, the last hypothesis (i.e., H_5) is not statistically significant ($\rho=.346$) at any level. These empirical results in direction and statistical significance generally support the RBV theory in spite of the one insignificant relationship between dynamic capability and process performance.

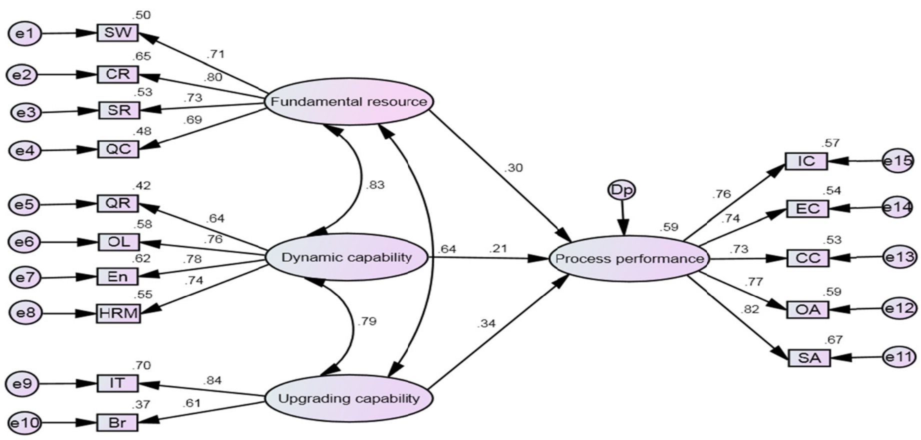

Figure 2. Standardized output of the overall model for study of SCA on RBV

Notations: SW=skillful worker, CR= customer relationship, SR= supply relationship, QC= quality control, QR= quick response, OL= organizational learning, En= entrepreneurship, HRM= human resource management, IT=information technology, Br= branding, IC=internal cohesion, EC= external communication, CC= cost control, OA= order acquisition, and SA= strategic adaptability. Each of these measured variables links to an error term noted by "e".

The standardized output of the overall model provides additional information (Figure 2). The correlations, i.e., fundamental resource (FR)↔(DC) dynamic capability (0.83), fundamental resource (FR)↔(UC) upgrading capability (0.64), and upgrading capability (UC)↔(DC) dynamic capability (0.79), are all at the medium-to-high level in effect size while the path estimates, e.g., fundamental resource (FR)→(PP) process performance (0.30) and upgrading capability (UC)→(PP) performance capability (0.34), are quite similar at the medium level (Kline, 2005: 121). In addition, the result that 59 percent of the variance of process performance can be explained by the three exogenous constructs in the model further suggests appropriateness and effectiveness of the measurement of constructs and the hypothesized model as well.

6. Discussion and Conclusion

This study investigates the measure of SCA in the hope to make contribution to the RBV theory. To this end, both the RBV and BPMS literature are reviewed. RBV is reviewed to formulate the conceptual framework as well as to examine the definition of SCA and thus allowing the concept to be measured accordingly. BPMS is also reviewed to develop the SCA measure and its operationalization. Grounded on the synthesized theories of RBV and BPMS and also taking into account the research background, SCA is then measured by process performance, itself operationalized as 5 survey items in this study. Appropriate and effective measures are assumed to conform to the relevant theory, that is, three exogenous constructs measuring R&Cs (i.e., fundamental resource, dynamic capability, and upgrading capability) are hypothesized to be positively and significantly related to process performance. Using survey data in the Chinese clothing industry, we empirically examine appropriateness and effectiveness of this measurement.

Testing results of the measurement model suggest that the measurement of process performance itself is appropriate in convergence validity, which is reflected in terms of the loadings (ranging from 0.73 to 0.82) (Figure 2), the high AVE value (.58) and the very good construct reliability (.83) (Appendix 2). The inter-construct discriminant validity is generally accepted. The results also indicate good model fit, e.g., chi-square X^2= 158.243 (ρ= .000, df= 84), absolute fit measure RMSEA = 0.065, and baseline fit measure CFI= 0.957.

To further check whether process performance is effective in measuring SCA from the RBV perspective, we examine it in a hypothesized structural model. Firstly the results suggest that the structural model fits the data well (Table 3), e.g., the chi-square χ^2(158.243 with df=84) at the 0.001 level, the normed chi-square (1.884), the CFI (.952), GFI (.906), and the RMSEA (.065 with 90% confident interval between .49 and .81). Secondly, the empirical results indicate that 5 out of 6 hypotheses are consistent with the theoretical expectations. That is, the three exogenous constructs are significantly and positively correlated with one another at the .001 level and also both exogenous constructs of fundamental resource and upgrading capability are positively related to process performance at the .05 significant level. However, the third exogenous construct (i.e., dynamic capability) is positively related to SCA but not at any significant level, which suggests that the hypothesized relationship between dynamic capability and process performance is not supported with this dataset.

However, we should not jump to the conclusion that the theory is rejected merely based on only one statistically insignificant result. But rather it is concluded that RBV theory is generally supported with this set of data and the hypothesized model in the research background of the Chinese clothing industry. Further we conclude that the measurement of SCA is appropriate and effective in testing RBV theory.

In addition to the empirical results discussed above that the construct convergence and reliability are validated, and that the model fit is suggested to be good, and that 5 out 6 hypotheses are supported, this conclusion is also based on the following considerations and rationales. *Firstly,* generally speaking, priority should always be given to theory rather than statistical technique in the empirical analysis. For example, should the sample size be large enough there might not be problem with statistical significance. *Secondly,* from a theoretical perspective, one plausible explanation for the insignificant relationship between dynamic capability and process performance may relate to the specific research background. The hypothesized relationship between dynamic capability and process performance (measuring SCA) is based on the general underpinnings of RBV theory. However, this might not hold true in the clothing industry and/or in China. *Thirdly,* it might have had a different story if longitudinal instead of the cross-sectional data were adopted. This idea could be the future research.

One more point is necessary to be addressed and reflected upon in the conclusion. We conclude from the statistical results that the process performance measurement is appropriate and effective in testing RBV but we cannot conclude process performance is a more appropriate measure in comparison to the financial performance measure. Theoretically we have discussed this issue earlier in this paper and concluded that process performance is more appropriate than financial performance. Can we test the idea empirically? This question could lead to another future research direction on the issue.

Our initial interest and the primary research question in this paper are to enhance our understanding of the methodological and measurement issues underpinning RBV theory. Therefore, main contributions of the paper may provide implications for empirical researchers in their further studies in this domain. *The first contribution* is about the research issue. The paper develops and tests the measure and measurement of SCA from the RBV perspective. Few previous empirical studies have paid sufficient attention to this issue. In addition, various financial performance indicators are traditionally used to measure SCA. However it is practically difficult to get access to the financial data since it is sensitive to many small-and-medium sized companies. We propose to use process performance to measure SCA and to test RBV theory, which is more practical way to get access to the data and which also conforms to the theoretical underpinnings. *The second contribution* is about the research methodology. Ray et al. (2004) propose the theoretical argument that process performance is more appropriate to measure SCA but the authors' argument is confined to a discussion of the logic reasoning grounded on the resource-based view. In this study, we first discuss the theoretical argument by synthesizing both theories of RBV and BPMS and then proceed with an empirical test. This is a theoretic-empirical alignment perspective in research methodology. Moreover, this study quantifies SCA and operationalizes the measure of process performance. Although the measures and measurement may be far from perfection as this is a pioneering area in RBV theory, it is hoped that this paper could arouse more concern and interest to this specific research issue. *The third contribution* is about the model which is originally designed for this study (Figure 1).To examine the hypothesized relationships between SCA and R&Cs, we firstly have to develop constructs and corresponding indicators to measure both SCA and R&Cs, and then formulate the structural model, both of which are originally created for this study. *In summary,* the empirical results are generally aligned with the theory and thus the measurement is supported. In doing so, we contribute to the resource-based theory in terms of the SCA measurement and of the empirical test.

Moreover, this empirical test uses primary data collected in the Chinese clothing industry. Therefore the empirical results can provide some implications for the managers who are seeking to pursue and implement sustained competitive strategy. *On the one hand,* the implications from this study concern business performance measurement. The 5 process performance indicators (Figure 2) are effectiveness of internal cohesion, effectiveness of external communication, effectiveness of cost control, effectiveness of order acquisition, and strategic adaptability. The high factor loadings, ranging from .73 to .82 at the .001 significance level, suggest that the managers could take these indicators into their consideration as business performance management indices in addition to the traditional accounting and financial indices. These process indicators are specific compared to the general financial indicators so that the managerial team can check and monitor the company performance in the corresponding specified areas, e.g., acquiring orders, managing cost control in procurement, managing communication with customers and within the company, and updating their strategies against the external dynamics. *On the other hand*, concerning the core firm-level resources and capabilities contributing to SCA, the Chinese clothing manufacturing companies need consider the resource bundling effect, which is suggested in the statistical results (i.e., medium-to-high correlations). Fundamental resource, e.g., skillful worker, quality control, customer relationship, and supplier relationships, is inevitably necessary for company's survival whist upgrading capability in establishing & managing the company's own brand can result in higher-value added end and updating capability via branding and technology information is urgent and strategic development for SCA of the industry. However, this is not the main focus of this current paper but it could be another future search direction.

These implications are not only relevant to the Chinese clothing industry but to the other labor-intensive manufacturing industries (e.g., furniture and home appliance) in other developing economies who may experience a similar process of industrialization as with China.

This study also contains limitations. One limitation is the non-random sampling method due to the practical difficulty in taking random sampling. Hence indispensable drawbacks may exist to some extent, i.e., deviation from traditional random sampling guidelines for achieving scientific rigor. The other limitation is that this study focuses on the SCA measurement and therefore the other issues are less discussed, e.g., the measurement of R&Cs and the alternative structural models. However these limitations provide further opportunities and suggest future research directions, which may provide more contributions to our understanding of RBV theory and more practical recommendations to the Chinese clothing industry and the managers.

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Notes

Note 1.The nine dimensions are strategic alignment, strategic development, focus on stakeholders, balance, dynamic adaptability, process orientation, depth & breadth, casual relationships, and clarity & simplicity (Garengo et al., 2005)

Note 2. The eight BPMS models developed from earlier to latest are performance measurement matrix (Keegan et al., 1989), performance pyramid system (Lynch & Cross, 1991), result and determinants framework (Fitzgerald et al., 1991; Moon & Fitzgerald, 1996), balanced scorecard (Kaplan & Norton, 1992, 1996), integrated performance measurement system (Bititci et al., 1997), performance prism (Neely et al., 2002), organizational performance measurement (Chennell et al., 2000), and integrated performance measurement for small firms (Laitinen, 1996, 2002).

Note 3. This study follows Churchill's (1979) procedure for developing better measures of constructs. Initially a list of 18 items was drawn from the literature and then 4 constructs were extracted based on exploratory factor analysis. Further, the analysis adopted a two-step approach of SEM (Anderson & Gerbing, 1988) and as a result of model modification, 3 observed variables were deleted due to loadings lower than the guideline .05 or due to the cross-loading problem.

Appendix 1. Constructs and corresponding indicators with references and survey statements

Construct	Indicator and reference	Survey statement
Process performance (PP)	Strategic adaptability (SA) (Wu, 2010)	Since the financial crisis, the company has quickly adapted to the global market recession in strategy.
	Cost control (CC) (Zhu, 2004)	Since the financial crisis, the company has been able to control costs properly (e.g., costs of raw material, labor, and land).
	Order acquisition (OA) (Bititica, 2011)	Since the financial crisis, the company has still been able to receive stable orders successfully.
	External communication (EC) (Lee et al., 2001; Bititica, 2011)	Since the financial crisis, the company has developed effective external communication channels and been able to work with external parties effectively.
	Internal cohesion (IC) (Lee et al., 2001; Bititica, 2011)	Since the financial crisis, the company has developed strong team cohesion and all the staff has been confident to and worked for the future.
Fundamental resource (FR)	Skillful worker (SW) (Wernerfelt,1984; Barney,1991)	The company has a stable number of skillful workers.
	Customer relationship (CR) (Boyd et al., 2010)	The company possesses a stable and high-quality customer group.
	Supplier relationship (SR) (Bonaccorsi & Lipparini, 1994; Koufteros et al., 2002)	The company keeps good relationship with the suppliers, which secures a stable and effective supply.
	Quality control (QC) (Powell, 1995; Tuan & Yoshi, 2010)	This company is able to provide products with satisfactory quality to the customers, and the quality is steady.
Upgrading capability (UC)	Branding (Br) (Aaker,1989; Keller, 2009)	This company has strong capabilities in brand development and brand management.
	Information technology (IT) (Mata et al., 1995; Powell & Dent-Micallef, 1997)	The production process in this company is effectively supported with advanced information technology.
Dynamic capability (DC)	Quick response (QR) (Lewis, 2000; Womack & Jones, 2005)	The company is able to respond quickly to the market changes, e.g., product design, quality, price, output elasticity, delivery, and placement.
	Human resource management (HRM) (Amit & Belcourt, 1999; Chadwick & Dabu, 2009)	Human resource management in this company is strong enough to ensure coherence of the organizational aim with maximized personal development of the employees.
	Organizational learning (OL) (Crossan & Berdrow, 2003; De Geus, 1988)	The strong organizational learning capability of the company ensures effective adjustment to the dynamics of external environments.
	Entrepreneurship (En) (Simon, 2010)	The leaders in this company are capable and innovative in decision-making, team motivation, and effective communication.

Appendix 2. Convergence validity- Loadings, AVE, and construct reliability

Construct	Measured variable	Loading estimates	S.E.	t-value	Standardized loadings	AVE	Construct reliability
Upgrading capability	Branding	1.000	--	--	.609	53.5%	0.518
	Information technology	1.164	.158	7.365	.836		
Fundamental resource	Quality control	1.000	--	--	.692	56.5%	0.793
	Skillful worker	1.109	.124	8.970	.708		
	Supply relationship	1.065	.119	8.918	.728		
	Customer relationship	1.293	.126	10.255	.804		
Dynamic capability	Human resource management	1.000	--	--	.742	56.8%	0.761
	Organizational learning	1.014	.097	10.495	.764		
	Entrepreneurship	1.059	.099	10.713	.785		
	Quick response	0.842	.094	8.966	.645		
Process performance	Internal cohesion	1.000	--	--	.756	58.0%	0.833
	Order acquisition	1.127	.104	10.809	.771		
	External communication	0.988	.093	10.593	.738		
	Cost control	0.985	.093	10.600	.729		
	Strategic Adaptability	1.169	.101	11.586	.817		

Appendix 3. Construct correlation matrix (standardized) and construct variance

	Dynamic capability	Fundamental resource	Upgrading capability	Process performance
Dynamic capability	***.823***	.691	.629	.521
Fundamental resource	.831 ***	***.530***	.416	.473
Upgrading capability	.793 ***	.645 ***	***.859***	.482
Process performance	.722 ***	.688***	.693 ***	***.731***

Notes: Values below the diagonal are correlation estimates among constructs, diagonal elements are construct variance, and values above the diagonal are squared correlations. *** denotes significance at the .001 level.