

The Causal Links among Market Fitness, Organizational Process and Performance: Empirical Evidence from Taiwan's Electronics Industries

Tung-Shan Liao*

Measuring dynamic capabilities and estimating their consequences on performance are challenging as they are naturally complex and multi-dimensional. This study aims to investigate the effect of a firm's market engagement on performance, and its role in linking firm internal processes and performance. This study focuses on the mediating role of market fitness in order to empirically clarify how a firm's organizational procedural capabilities drive its performance. For empirical analysis, this study conducts path analysis on a ten-year-long panel dataset with 413 listed companies across Taiwan's electronics industries. The major contribution of this study to strategic management literature is that this study operationalizes the microfoundations of dynamic capabilities for both organizational processes and market fitness based on return on invested capital. The measures developed for the present analysis can be viewed as a set of yardsticks for empirically drawing the performance of dynamic capabilities.

JEL Codes: C23, M10 and L19

1. Introduction

The dynamic capabilities view (DCV) follows a fundamental view in how firms evolve in responding to the environment (Agarwal & Selen 2013). Di Stefano, Peteraf and Verona (2010) identified two distinct schools of dynamic capabilities. While The Teece, Pisano and Shuen (1997) school shows how idiosyncratic dynamic capabilities lead to a superior resource position in the marketplace, the Eisenhardt and Martin (2000) school argues that dynamic capabilities often appear in the form of best practices, change the forms in which they become observable in a changing environment. Both views could be extended as a concept of market fitness in the DCV.

The concept of market fitness is a reflection of the extent to which a firm's dynamic capabilities empower it to adapt to a changing environment (Teece et al. 1997). This view is reflected in a reference to the process of reconfiguration and transformation of resources and competencies of firms (Rice et al. 2015, Teece et al. 1997). It presents a firm's advances in dynamic capabilities for redeveloping and redeploying its resource base; hence, its resource position enters a new state (Liao & Rice 2010, Teece et al. 1997, Teece 2007).

A firm's resource position is stated as a causal influence derived from technical fitness (Helfat et al. 2007). Empirical research into the DCV often frames technical fitness as a factor determining the performance of dynamic capabilities, referring to cost and quality, to illustrate how firms evolve internally. In the contrary, conceptualizing market fitness of a firm

*Tung-Shan Liao, College of Management, Yuan Ze University, Taiwan. Email: valenliao@saturn.yzu.edu.tw

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implies that firm development is critically context dependent (Liao & Rice 2010), suggesting the evolutionary influence of how a firm's dynamic capabilities perform in responding to market dynamism (Eisenhardt & Martin 2000), and vice versa.

Yet, the view of market fitness remains poorly understood with empirical evidence. Investigating the role of market fitness in firm performance creation, market fitness is suggested as a firm's 'external' presence, presenting a firm's capabilities of market engagement (Liao, Rice & Lu 2015). While the past study into market fitness (e.g. Agarwal & Bayus 2002, Liao & Rice 2010, and Liao et al. 2015) might be contributive for the identification the theoretical role of market fitness (as a dynamic capability of a firm), empirical evidence in a longitudinal investigation to support market fitness, still sparse, has been provided. In so doing, this study is motivated by exploration of how market fitness is to be measured and how its role in connecting firms' operations and performance.

In this paper, the purpose is to propose the mediating role of market fitness in linking a firm's internal processes and its performance, arguing that market fitness varies according to the evolutionary influence of a firm's organizational processes, and that it plays an influential role in maintaining a firm's competitive advantage. This study suggests that market fitness is understood as the manner in which a firm's actual market position is affected by its market engagements, and generally reflects how well a firm formulates and implements its advantageous resources (Agarwal & Bayus 2002, Liao et al. 2015).

This research is a step further in building a set of empirical elements of evolutionary fitness of a firm. This study carried out a panel data analysis on the proposed mediating relationship of the study. In addition to operationalizing these empirical elements, this study provides a set of significant empirical evidence to examine how a firm's dynamic capabilities, specifically organizational processes, drive its changes of market engagement and presences, and hence this paper contributes a set of understanding of how firms evolve in marketplaces. Therefore, this study contributes, also, the evolutionary influence of dynamic capabilities on the interaction between firms and environmental changes to the DCV.

In the following section, the author review the theoretical foundations of the paper in the perspective of dynamic capabilities, and develop hypotheses in order to frame a mediated model for explicating the role of market fitness, and how it is driven by organizational process and affects firm performance. Then the use of methodologies is explained, followed by demonstrating the present results of the analysis. Finally, this study discusses the results and express the findings with theoretical and practical implications.

2. Theoretical Underpinnings

The DCV has emerged in response to the arguably static equilibrium nature of the resource-based view (RBV) and the innate problems such quiescent approaches have in the context of increasingly dynamic and capricious markets (Foss & Ishikawa 2007, Zahra, Sapienza & Davidsson 2006, Teece et al. 1997, Teece 2007). It has been suggested that the dynamism of these competitive environments constantly drives industrial firms to adapt in terms of their heterogeneous resource deployment and re-development processes, with a view to ensure both continued growth and even survival (Helfat & Peteraf 2003). These dynamic realities, both in exogenous (such as customers and competitors) and endogenous (such as firm operations and process) terms have provided a spur to vitalize their static models of both firm resources as well as industry structure and positioning.

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The DCV specifically addresses how firms “integrate, build, and configure” their resource base (Teece et al. 1997, p.516) over time to respond to changing environments. Still, the DCV is generally viewed as somewhat of an extension of the RBV in that it builds upon many of the assumptions initially developed within the RBV (Ambrosini & Bowman 2009, Easterby-Smith, Lyles & Peteraf 2009, Eisenhardt & Martin 2000, Galvin et al. 2014). Capabilities need to be valuable, rare, imperfectly imitable and organizational (VRIO) as per Barney (1996), while the same isolating mechanisms introduced by Rumelt (1984) similarly apply (Eisenhardt & Martin 2000, Helfat et al. 2007). The DCV thus extends the RBV not by way of the principle assumptions, but rather by the capacity to better understand changes in a firm’s resource endowments.

While the DCV and RBV rely upon many of the same assumptions, the underlying theoretical bases differ significantly. RBV emerged from an economics perspective, with Peteraf (1993) highlighting the importance of Ricardian rents in respect of competitive advantage alongside monopolistic rents. The DCV also emerged from an economic viewpoint; but in this case, evolutionary economics formed the central tenant with Teece et al. (1997), building extensively on the work of Nelson and Winter (2002) and Schumpeter (1934, 1950). The result is a “process-position-path” framework that highlights the nature and antecedents of the dynamic capabilities of a firm, especially how organizational processes transform the resource base in adapting to a changing environment (Teece et al. 1997).

Similar definitions on dynamic capabilities from other influential scholars (Eisenhardt & Martin 2000, Helfat et al. 2007, Zollo & Winter 2002) also suggest a perspective that highlights and embodies organizational processes at the core of the DCV that build a firm’s capacity “to purposefully create, extend, or modify its resource base” in response to an ever-changing environment (Helfat et al. 2007, p. 4). Teece’s (2007) later work on the “sensing-seizing-transforming” framework on the DCV thus set out to emphasize that organizational processes support a firm’s capabilities to face environmental threats, sense and seize opportunities and, where appropriate, transform a firm’s resources to exploit these opportunities.

Empirically, regarding organizational process in the dynamic capabilities literature, an emerging stream of the research is examining the microfoundations of dynamic capabilities and their contributions to resource allocations. Rice et al. (2015) identified three major types of research: the interactions of specific processes (e.g. Karim & Mitchell 2000, Moliterno & Wiersema 2007), the role of learning and its influences (e.g. de Waard, Volberda & Soeters 2012, Newey, Verreyne & Griffiths 2012), and decision-making processes and the role of individuals in carrying them out (e.g. Corner & Wu 2012, O’Reilly et al. 2009).

The review of this study on the DCV reveals that the major contributions of significant DCV research generally remain at the conceptual discussion and the argument of the theoretical position between the DCV and the RBV. Empirical research regarding with the measurement of dynamic capabilities, the relationship between dynamic capabilities and performance is still handful. While some studies contribute empirical insights for a microfoundation basis, their investigations remain at a general level of organizational process for understanding how firms deploy dynamic capabilities (Felin et al. 2012). In addition, these studies are still considered as too inwardly focused. While they offer some understanding on how firms evolve, they contribute little to the understanding of how a firm’s evolution influences the ways that it actually adapts to the environment dynamics.

3. Hypothesis Development

In order to better understand how well a firm evolves to fit in the environmental dynamics, this paper frames the effects of organizational processes on performance, mediated by market fitness. In this study, the author defines market fitness as a firm's competencies in regard to market engagement and operations that affect its adaptation to markets (Liao et al. 2015), and the research suggests that market fitness can reflect evolutionary fitness, referring to how well a dynamic capability determines a firm's adaptation to the market. The proposed model is thus built on a series of microfoundations of organizational processes; this study examines their evolutionary influences on market fitness, and consequent linkage to firm performance.

Entrepreneur and marketing papers interpret the term 'product-market fit' as a precondition to validate the extent to which a product can satisfy a market (Brown & Eisenhardt 1995, Osterwalder et al. 2015), especially regarding the manner in which firms shape or sense opportunities in a market of interest (Teece, 2007). Firms potentially anticipate (and then propose) new products, often with a minimum viable product (MVP), to exploit these opportunities. This process generally requires defining relevant factors in a product market, such as 'customer segments', 'value proposition', 'channels' and 'relationships', to refine or rebuild the business model or organizational processes in order to seize those sensed opportunities (Osterwalder et al. 2015).

This paper suggests that a firm should match and even create market opportunities by reorienting its market position. 'Market fitness', as proposed by this paper, refers to the dynamic manner in which a firm changes its market position by altering its market fit; hence, this study defines measurement of the performance of dynamic capabilities on the basis of a market perspective.

In a measurement sense, this paper includes 'channels' and 'relationships' as the microfoundations of market fitness, and reforms them into a dynamic view through a capability presence, namely, 'channel management capabilities' and 'customer relationship management capabilities'. The author excluded 'customer segments' and 'value proposition' from the capability hierarchy of market fitness due to their static meaning in defining the market position. In addition, it may be argued that these two aspects of microfoundations are linked to a decision-making process (or capability) in which the individual cognition and structural configurations play a determinant role (Corner & Wu 2012, Tasselli, Kilduff & Menges 2015). Such a decision-making process that properly reflects an administrative process has a microfoundation presence of internal process, instead of market fitness. As such, this paper excludes 'customer segments' and 'value proposition' from the hierarchy of market fitness of the firm.

This paper assumes that a firm that adapts well to the market (i.e. it has superior market fitness) has better performance. Empirically, this study thus suggests the following hypotheses to present how market fitness affects performance by a microfoundation hierarchy.

Hypothesis 1a: A firm's superior capability in managing channels will positively influence its performance.

Hypothesis 1b: A firm's superior capability in managing customer relationships will positively influence its performance.

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It has always been understood that dynamic capabilities help firms adapt to, or create, market changes (Eisenhardt & Martin 2000, Teece et al. 1997, Teece 2007). This definition implies a strong relationship between organization process and environmental change. Influential studies on dynamic capabilities highlight the critical role of organizational processes in seeding a firm's dynamic capabilities (e.g. Eisenhardt & Martin 2000, Helfat et al. 2007, Teece et al. 1997, Teece 2007). This is underpinned by both learning and reconfiguration processes, as suggested by Teece et al. (1997); they spur firm dynamics. Learning has been suggested as the origin of firm dynamics and reconfiguration as a special ability to trigger a firm's dynamics in transforming the resource base (generally noted as 'reconfiguration and transformation' in many papers, and herein); the latter especially confers a vital capability for firms to timely respond to market change (Teece et al. 1997, Lin & Wu 2014).

In exploring the microfoundations of organizational processes, the work of Felin et al. (2012) on firm routines and capabilities has identified three aspects of firm procedural microfoundations: individuals, social processes and structure. Rice et al. (2015) emphasizing routinized and systematic learning characteristics embedded in firm processes, such as procedural formalization, the social integration platform and information maturity, explore their roles in affecting performance. In addition, much recent work by Helfat and Peteraf (2015) identifies managerial cognitive capability as a microfoundation of dynamic managerial processes while engaged in both physical and mental activities at the individual level.

Following Barney and Felin's (2013) contribution on microfoundations, the approach of this study is essential to explain the social and collective relations and aggregation entities within organizations. This study extended and explored the microfoundations of dynamic capabilities within the context of organizational processes on the perception of functional activities and organization settings (Helfat et al. 2007). A function-based application in organizing firm structures is the most fundamentally rooted in all types of organizations (Khandwalla 1973). Managerial activities that are grouped according to function, by placing employees with shared skills and knowledge, influentially encourage collective learning, reinforce the knowledge base and promote individual performance (Griffin 2013, pp.158-159, Khandwalla 1973). In addition, this paper argues that each functional element within the hierarchies of organizational process presents a basis for the internal evolution whereby firms perform in regard to resource allocation and capability development.

Three managerial processes were thus developed in order to present a potential set of microfoundations of dynamic capabilities; these microfoundations would be developed according to the cost-to-value basis to meet the aim of this paper at providing a set of empirical elements of evolutionary fitness. These processes, as defined by this paper, are as follows:

- Research and development (R&D) management process refers to an organizational process in which new products (and services) are developed; they generally include designing, transfer of new knowledge and technology and innovation (Brown & Eisenhardt 1997, Chanaron & Jolly 1999).
- Manufacturing management process refers to activities defining how products are to be manufactured (Pisano 1994, Simões, Gomes & Yasin 2011).
- General administrative refers to the management process mainly involving administration, planning, decision-making, selling activities, and other major non-

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production business routines within a firm (French 1963, Corner & Wu 2012, Tasselli et al. 2015).

With the central perception of market fitness, as discussed above, this paper argues that how well a firm performs in organizational processes influences its development of external fit. This logic leads to three sets of hypotheses, listed below, by which the author empirically investigates the direct causal relationship between organizational process and market fitness. The above three management processes are used to deconstruct the organizational process, while market fitness is based on the microfoundation hierarchy, as it was developed above, with channel and customer relationship management.

Hypothesis 2: The greater the performance of the R&D management process, the better the market fitness a firm will obtain.

Hypothesis 2a: If a firm has better managerial efficiency in its R&D process, it will maintain better relationships with its customers.

Hypothesis 2b: If a firm has better managerial efficiency in its R&D process, it will have a superior capability in managing its market channels.

Hypothesis 3: The greater the performance of the manufacturing management process, the better the market fitness a firm will obtain.

Hypothesis 3a: If a firm has better managerial efficiency in its manufacturing process, it will maintain better relationships with its customers.

Hypothesis 3b: If a firm has better managerial efficiency in its manufacturing process, it will have superior capability in managing its market channels.

Hypothesis 4: The greater the performance of its general administrative process, the better the market fitness a firm will obtain.

Hypothesis 4a: If a firm has better managerial efficiency in its general administrative process, it will maintain better relationships with its customers.

Hypotheses 4b: If a firm has better managerial efficiency in its general administrative process, it will have a superior capability in managing its market channels.

4. Research Method

4.1 Data and Sample Collected

The context for this study is Taiwan's electronics-related manufacturing firms. In the present investigation, there are 413 listed companies from various industries, such as semiconductors, computers and peripherals, photoelectronics, communication and network, electronic parts and other electronics industries. The electronics-related manufacturing industry contributes over 30% to Taiwan's GDP according to a report available from the IEK (2013). In addition to its development of more than 40 years, Taiwan's electronics-related manufacturing industry has built the most comprehensive vertical chain system, and plays a critically influential role in the global market (IEK 2013). This study collected data from the financial database of Taiwan Economic Journal (TEJ), by which the research built a ten-year (from 2004 to 2013) yearly-based panel dataset.

4.2 Independent and Intervening Variables

The financial drivers of the DuPont identity were used as the basis to measure the factors of organizational process and market fitness (Firer 1999). By referring to Soliman (2008) and Tang and Liou (2010), this study developed three organizational process elements and two market fitness elements through a deconstructing procedure of return on invested capital (ROIC, shown in Figure 1) (Koller, Goedhart & Wessels 2005). These elements, discussed as follows, were thus operationalized as a set of proxy variables to measure a firm's efficiency in various aspects of operations (Tang & Liou 2010), in order to investigate the managerial capabilities of firms.

Figure 1: ROIC formula

$$ROIC = \frac{NOPLAT}{S} \times \frac{S}{IC} = \frac{(S - CGS - Adv - R\&D - Dep - SG\&A - Tax)/S}{(FA + AR + Inv - AP + Cash)/S}$$

ROIC: return on invested capital; NOPLAT: net operating profit less adjusted taxes; S: sales; IC: invested capital; CGS: cost of good sale; Adv: advertising expense; R&D: R&D expense; Dep: depreciation; SG&A: selling, general & administrative expense; Tax: sales tax; FA: fix assets; AR: accounts receivable; Inv: inventory stock; AP: accounts payable; Cash: cash.

Adapted from Tang, YC & Liou, FM 2010, 'Does firm performance reveal its own causes? The role of Bayesian inference', *Strategic Management Journal*, 31, p.46.

4.2.1 Organizational Process (Independent Variables)

R&D management capability (RDMC). This variable was operationalized as R&D intensity since the R&D process reflects a company's R&D efforts aiming at devising new applications, expanding knowledge and technology, and spurring product innovation through either basic and/or applied research approaches (Cohen & Levinthal 1990, Christensen, Burgelman & Wheelwright 2008). Following prior research, this paper measures R&D intensity by using the R&D expenditure to sales ratio (Fombrun & Ginsberg 1990, Tang & Liou 2010).

Manufacturing process management capability (MPMC). This variable measures the extent to which a firm performs its managing manufacturing activities. This paper adopts the cost of goods sold (CGS) to sales ratio as a proxy variable to investigate a firm's manufacturing-based procedural capability. CGS represents the direct costs attributable to the production of the goods sold by a firm, such as the cost of the materials and the direct labor costs (Bayou & De Korvin 2008).

General administrative capability (GAC). This paper operationalized this measure as general administrative know-how, reflecting the manner in which a firm performs in demonstrating its major non-production operational efficiency (Poston & Grabski 2001, Tang & Liou 2010). This proxy variable is developed by using the ratio of the cost of selling, general and administrative (SG&A) expenses to sales (Tang & Liou 2010). SG&A expenses consist of three costs of operating the firm: (1) the combined cost of all direct and indirect selling expenses, (2) general operating expenses directly related to the general operations, and (3) the combined costs of executive salaries and general support related to the overall administration of the company (Poston & Grabski 2001).

4.2.2 Market Fitness (Intervening Variables)

Channel management capability (CMC). Following on previous studies, this paper suggests that a radical element of market fitness is required to investigate firm capability in managing the channel for product distribution (Brouwer 1991, Damanpour 1991, Liao & Rice 2010, Schumpeter 1974, Sivadas & Dwyer 2000). The variable of CMC is thus operationalized as inventory turnover, calculated by the sales to stocks ratio; it shows how long it takes for a firm's inventory to be sold and replaced over a given period. This paper argues that the extent of a firm's know how, expertise and capabilities for distributing the goods demonstrates its performance in channel management (Tang & Liou 2010).

Customer relationship capability (CRC). Customer relationships, considered as a set of important organizational resources, are essential to create a firm's competitive advantage (Barney 2010). This paper operationalizes CRC as a firm's capability in managing its downstream performance. The author uses the receivables turnover ratio as a proxy variable to investigate CRC and its contributions to performance. As suggested in its essence, the receivables turnover ratio indicates the efficiency with which a firm manages credit offered to its customers and the subsequent collection (Bragg 2012); this process reflects how well a firm attends to existing, and even potential, customers. The receivables turnover ratio is calculated by dividing the net value of credit sales during a given period by the average accounts receivable during the same period (Bragg 2012, Tang & Liou 2010).

4.3 Dependent Variables

For performance, this paper measures it according to both accounting and economic aspects. In the accounting aspect, this study measures firm performance as a firm's return on assets (ROA) and return on equity (ROE). For measuring firm performance in the economic aspect, this paper employs sales growth (SG). These three variables were obtained from the TEJ financial database over 10 years. Using ROA as a dependent variable, this study was set to observe the changes of firm profitability over time, as it is generally believed that the ROA percent is a general baseline on which profit contributions required from investment can be actually measured (Lindo 2008). For the use of ROE as dependent variable in this study, the author considered that "ROE reflects not only the performance, but also the capital structure of listed companies" in the research contextual background of this study (Tai & Chen 2011, p. 245). Finally, this paper was also set to observe a firm's growth persistence on a market basis; hence, this paper developed a dependent variable, sales growth, for this observation (Helfat et al. 2007). Such observation indeed links to, and is incorporated in, the central view of market fitness that is strongly suggested by this paper.

4.4 Control Variables

In the present analysis, firm control variables included in order to justify the causal influence from the independent variables were 'firm size' measured by capital size (in logarithm) and 'firm age' as these two variable are considered to be related to a firm's intentions and operations in international marketplaces (Perry 1989). Such controls for the contextual settings of this study were essential as most of the firms' operations in Taiwan's electronics-related sectors are export oriented. In addition, the research controlled for the prior period firm performance (one-year lag) of ROA, ROE and SG in the corresponding proposed models according to the dependent variables, respectively. This study did this as it expected that previous firm performance might be influential in determining whether a firm's settings

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of organizational processes and market evolution are affected by its previous financial results (Figueiredo 2002).

4.5 Analyses

In regard to panel data analysis, this study applies the path analysis with observed variable (PA-OV) approach. Path analysis, introduced by Wright (1921), is a statistical method for testing a proposed model with complex causality, in which direct and indirect effects exist between and/or among endogenous and exogenous variables (Jöreskog & Sörbom 1988). The primary analytical technique used in this paper is panel data analysis undertaken with eViews 9.

Identified by Vermunt and Georg (2002) and Jurowski, Uysal and Williams (1997), as this study was organized, the use of longitudinal data obtained via panel studies enables researchers to detect determinants of firm changes in both external and internal environments. In addition, this study's approach to the assessment of the organizational processes and market fitness developed by adopting DuPont identity and ratios is significantly a step further to test and measure a firm's dynamic capabilities.

5. Results

5.1 Results Presented and Hypothesis Test

Table 1: Path Coefficients and Model Fit

Independent Variable	Intervening Variables		Dependent Variables		
	CMC	CRC	ROA	ROE	SG
Control Variables					
Age	-.146**	-.066	.009	.0178	.012
Log (Size)	-.078	.154**	-.584*	-3.236***	-.545
ROA(-1)	-	-	.693***	-	-
ROE(-1)	-	-	-	.489***	-
SG(-1)	-	-	-	-	.897***
Independent Variables					
RDMC	.146**	.332***	.077	-.043	-.101
MPMC	.113*	.274***	-.188	-.006	.144**
GAC	.215***	-.033	-.072	.039	.098*
Intervening Variables					
CMC	-	-	.099***	.707***	.031
CRC	-	-	-.047	.126**	.091*
Model Fit					
R^2	.097	.195	.573	.280	.865
se	.950	.898	0.65	0.85	0.37
F-statistic	8.77***	19.67***	229.99***	66.57***	1096.06***
DWTS	1.67	1.83	1.96	2.19	1.87

1. Sample period: 2003~2012; Cross-sections included: 413; Total panel observations: 4130.
2. Path coefficient is significant at the levels: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
3. ROA, ROE and SG are the dependent variables; CMC and CRC are the intervening variables.
4. se: Standard errors of the exogenous variables.
5. DWTS: Durbin-Watson stat

This paper conducts path analysis for each model (according to the designed dependent variables) through multiple regression analysis. The standardized beta weights from the regressions are the path coefficients that present the direct effects available from the exogenous variables to the endogenous variables (i.e. the paths from RDMC, MPMC and GAC to CMC, CRC, ROA, ROE and SG, respectively; and the paths from CMC and CRC to ROA, ROE and SG, respectively). In addition, the indirect effects of an exogenous variable (i.e. RDMC, MPMC and GAC) on an endogenous variable (i.e. ROA, ROE and SG) through an intervening variable (i.e. CMC and CRC) would be obtained by multiplying the path coefficient from an endogenous variable to an intervening variable by the path coefficient

that leads from the same intervening variable to a dependent variable (Juwowski et al., 1997). Tables 1 and 2 list the results of the path analysis of this study: Table 1 presents the results for the hypothesis tests and Table 2 shows the potential indirect effects of organizational processes on performance.

Table 2: Indirect and Direct Effects of Organizational Processes

Intervening Path		Indirect Effects		
Independent Variables	Intervening Variables	Dependent Variables		
		ROA	ROE	SG
RDMC	CRC	ns		
	CMC	.014		
	CRC		.042	
	CMC		.103	
	CRC			.030
	CMC			.005
Total Indirect Effects of RDMC		.014	.145	.035
Direct Effects of RDMC		ns	ns	ns
MPMC	CRC	ns		
	CMC	.011		
	CRC		.035	
	CMC		.080	
	CRC			.025
	CMC			.004
Total Indirect Effects of MPMC		.011	.115	.029
Direct Effects of MPMC		ns	ns	.144
GAC	CRC	.002		
	CMC	.021		
	CRC		-.004	
	CMC		.152	
	CRC			-.003
	CMC			.007
Total Indirect Effects of GAC		.023	.148	.004
Direct Effects of GAC		ns	ns	.098

1. Sample period: 2003~2012; Cross-sections included: 413.
2. The values of direct effects of RDMC, MPMC and GAC on ROA, ROE and SG are from Table 1.
3. ns: non-significant

Hypothesis 1 predicts that a firm that has superior capabilities in managing market channels (Hypothesis 1a) and customer relationships (Hypothesis 1b) will generate superior performance. The hypothesis tests of this part concern the tests for the direct and positive effects of intervening variables (CMC and CRC) on performance (ROA, ROE and SG). For Hypothesis 1a, two of three proposed paths: 'CMC -> ROA' (0.099, $p < 0.001$) and 'CMC -> ROE' (0.0707, $p < 0.001$), present significant results. For Hypothesis 1b, also two of three proposed paths: 'CRC -> ROE' (0.126, $p < 0.01$) and 'CRC->SG' (0.091, $p < 0.05$) obtain support from the sample.

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Hypothesis 2 predicts a positive and direct relationship between a firm's R&D management capability and its market fitness in both channel management (Hypothesis 2a) and customer relationship management (Hypothesis 2b). The path coefficients of 'RDMC -> CMC' (0.146, $p < 0.01$) and 'RDMC -> CRC' (0.332, $p < 0.001$), both of which are statistically significant, provide support for Hypotheses 2a and 2b.

This study tested the causal relationships that predict if a firm's manufacturing management capability would positively and simultaneously influence its capability development in channel management (Hypothesis 3a) and customer relationship management (Hypothesis 3b). These hypotheses also obtain significant support from the sample ('MPMC -> CMC': 0.113, $p < 0.05$; and 'MPMC -> CRC': 0.274, $p < 0.001$).

This paper also tests whether a firm's capability in managing the general administrative process influences its market presence (Hypothesis 4). This part of the test obtains partial support from the sample. There was a significant result in the test of 'GAC -> CMC' (0.215, $p < 0.001$) for Hypothesis 4a, while Hypothesis 4b ('GAC -> CRC'), depicting the causality between general administrative process and customer relationship, presents a non-significant result.

In summary, Hypothesis 1a and 1b, which depict the effects of the mediating variables (CMC and CRC) on performance, gains the partial support from the sample. Hypothesis 2 and hypothesis 3, the indirect linkages from RDMC and MPMC to performance through either CMC or CRC, are fully evidenced by the sample. Finally, for the Hypothesis 4, it gains the partial support from the sample, where only could GAC contribute to performance through CMC.

5.2 Robustness

Several robustness checks were performed to ensure the statistical validity of the path analysis of this study. First, the R-squares and other statistics (listed in Table 1, including F-statistics that are all significant and Durbin-Watson stats) attest that the models in the present analysis meet the statistical test of model fit. In addition, this study computed Pearson correlation between independent variables (including control variables and intervening variables) to ensure that there was no significant multicollinearity in the analysis. Table 3 lists descriptive statistics and intercorrelations for the designed variables. In the analysis of this study, significant multicollinearity among independent and control variables were not exhibited. All of the results of intercorrelations were lower than the benchmark of 0.9 (referring to a VIF (variance inflation factor) benchmark = 5, indicating potentially significant multicollinearity between the independent variables (O'Brien 2007)). The largest correlations between independent variables were detected about .409 between GAC and Log (Size).

This study also tested those paths that were not suggested to be the proposed paths in the theoretical model, in order to justify the mediating role of market fitness in connecting organizational processes and performance. This test investigates the possible direct effects on performance (i.e. ROA, ROE and SG) from organization processes (RDMC, MPMA and GAC). In the path analysis, the test was put into a saturated mode by including all the independent variables to estimate their contributions to ROA, ROE and SG, respectively. In the investigations on 'theoretically undefined paths', such as 'RDMC -> ROA', 'MPMC -> ROA' and 'GAC -> ROA' in the ROA model; 'RDMC -> ROE', 'MPMC -> ROE' and 'GAC ->

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ROE' in the ROE model; and 'RDMC -> SG, 'MPMC -> SG and 'GAC -> SG in the SG model, the author expected non-significant results as this study had proposed that organizational processes contribute to performance only through market fitness. The results, listed in Table 1, show that there are merely two (out of nine) paths are significant ('MPMC->SG' and 'GAC->SG'). For model interpretation within the panel data, market fitness was shown to provide a very strong mediating role linking organizational processes and performance relationship. The empirical results provided by the research, by using financial-based measures, identify that the relationship between dynamic capabilities and firm performance is potentially indirect through market fitness. Such contribution to the DCV is significant as the past research might not be able to provide financial-based empirical evidence to support its argument for the DCV.

Table 3: Descriptive Statistics and Correlations

	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1. ROA	11.856	7.923	1									
2. ROE	8.111	13.386		1								
3. SG	7.859	3.111			1							
4. Log(size)	6.174	.528	-.005	-.110*	.021	1						
5. Age	18.186	8.360	-.169**	-.124*	.187**	.197**	1					
6. CRC	6.2197	3.626	-.093	-.111*	.067	-.004	-.156**	1				
7. CMC	7.422	11.036	.677**	.718**	.057	-.004	-.140**	.021	1			
8. RDMC	.024	.072	.157**	.130**	-.092	-.242**	-.163**	.328**	.109*	1		
9. GAC	.121	.571	.030	.087	.129**	.409**	.105*	.031	.191**	-.068	1	
10. MPMC	.263	.312	-.065	.146**	.139**	-.186**	-.228**	.282**	.173**	.077	.112*	1

1. Sample period: 2003~2012; Cross-sections included: 413.
2. Correlation is significant at the levels: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
3. ROA, ROE and SG are the dependent variables

6. Discussion and Conclusion

The hypotheses developed from the proposed theory, arguing that organizational processes can contribute to performance only insofar as they become influential in relation to the market fitness of a firm, gained partial support from the sample collected. From the present investigation, this study finds great support for predicting that organizational processes, such as RDMC, MPMC and GAC, have a direct and positive relationship with the market fitness of a firm in the forms of CMC and CRC. In such prediction, there is only one (out of six) path, from GAC to CRC, obtained no significant support. For the relationship between market fitness and firm performance, this paper finds evidence that fully support the relationship between market fitness and ROE, while partially supporting this in the ROA and SG aspects.

These findings help the research identify the potential indirect effects of organization processes on performance. In Table 2, this study finds a major approach through which organizational processes can contribute to ROA intervened by CMC at the levels from 0.014 to 0.021. These indicate that, exemplified by the effect of GAC on ROA, increasing the procedural efficiency with the SG&A to sales ratio by 1% would likely promote ROA at 0.021%. For the SG aspects, the major way in which organizational processes advance SG is through CRC at the levels from 0.007 to 0.030. For ROE, the present investigation provides significant evidence that a firm's capabilities performed through its R&D, manufacturing and general and administrative processes can influence ROE indirectly through its market fitness in both channel management and customer relationship management. For example, according to the findings of this paper, if a firm can increase its

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manufacturing procedural efficiency by 1%, it would totally promote its ROE at 0.115% (for R&D, it is about 0.145%; for GAC, it is about 0.148%). However, for the analysis on ROE, the path from GAC to ROE via CRC is not significantly related; while the path via CMC is strongly significant. This shows that a firm that performs well in the GAC aspect will have good performance in ROE through how its GAC activities influence its operations in customer relationship management.

In addition to the potential indirect effects of RDMC, MPMC and GAC on ROA, ROE and SG, respectively, Table 2 (and Table 1) lists significant direct effects of MPMC on SG (0.144, $p < 0.01$) and GAC on SG (0.098, $p < 0.05$). Since this article assumes that dynamic capabilities and firm performance do not necessarily go together (Helfat, et al, 2007, Liao & Rice, 2010, Liao et al., 2015, Zott, 2003), the coefficients of MPMC and GAC would not be expected to be directly related to SG (as this paper discussed above in robustness analysis). The sample this study collected, nevertheless, seems to present the possibility that dynamic capabilities may have direct influences on performance in some circumstances (i.e. the sample's behavior from MPMC and GAC on SG, respectively). Dynamic capability research has identified that when dynamic capabilities play a role in developing a firm's advantageous resources (that is to say, mediating the effects of firm resources on performance), these dynamic capabilities directly impact firm performance (Lin & Wu 2014). Still, for the major findings, the sample behavior in the present investigation supports the proposed model that organizational processes and performance are indirectly related.

One contribution of this study is that this paper extends the dynamic capabilities view through theorizing on market fitness. This paper suggests that market fitness, as an external fit of the firm, encompasses a dynamic sense in the depiction of firms' evolutionary fitness in the marketplace (Liao et al. 2015). This approach contrasts with the relevant discussion in evolutionary families. Most dynamic capability contributions generally have an inward focus on how firms develop (or re-develop) and deploy (or redeploy) resource bases through a dynamic capability mechanism (Helfat et al. 2007, Kindström, Kowalkowski & Sandberg 2013, Leih, Linden & Teece 2015, Teece, 2007), while revealing little understanding on the external fitness of the firm. This study has theorized and identified the relationship between a firm's external fitness and internal fitness. This paper concedes technical fitness as a critical set of internal fitness strongly reflecting internal procedural efficiency, with which the evolutionary fitness of firms is underpinned (Helfat et al. 2007). Furthermore, the research provides strong evidence for the variation of internal fitness to which a relatively better performing company would have adaptive advantages in its market (Breslin 2008, Galvin et al. 2014); these in turn lead to enhanced firm performance.

Other significant contributions to the relevant dynamic capability literature include also that this study develops financial-based measures for assessing the organizational procedural efficiency and market fitness by adopting DuPont identity and deconstructing the ROIC ratios (Firer, 1999, Koller et al. 2005, Soliman 2008, Tang & Liou 2010). Dynamic capabilities are indicated by "the capacity of an organization to purposefully create, extend, or modify its resource base" to respond to the changes in the marketplace (Helfat et al. 2007, p. 5). While this definition is often criticized as abstract, this study's operationalized approach for defining such firm 'capacity', such as RDMC, MPMC and GAC in organizational processes and CMC and CRC in the market fitness respect, extends the ways in which research observes a firm's development of dynamic capabilities through real and concrete resource commitments and processes. This study acknowledges that the approach used in the research follows Barney and Felin's (2013) contribution in order to develop the associated microfoundations based

on the collective relations and aggregation entities within organizations. This paper, as a result, provides empirical insights into the manner in which specific organizational processes, measured at a micro level of dynamic capabilities, forming an evaluation basis for their evolutionary influence by which a firm evolves in response to environmental changes.

This study makes a significant contribution to dynamic capabilities literature through the ten-year-long panel investigation across Taiwan's electronics industries. To contribute a vital dynamic understanding to strategic management literature, investigating the changes in both marketplace and firms along with the time factor is always an essential aspect. Indeed, empirical research on the dynamic capabilities literature, in general, has often been criticized for drawing on cross-sectional data (Arend & Bromiley 2009). Indeed, observations that are implemented through a relatively long-term timeline on the dynamism of markets and firms can provide convincing dynamic insights into strategic management literature (Eisenhardt & Martin 2000, Jurowski et al. 1997).

This is evidently because markets are themselves dynamic, and the persistence of firm capabilities varies with the dynamism of markets (Teece et al. 1997, Eisenhardt & Martin 2000, Helfat et al. 2007). A cross-section investigation into dynamic issues has a key and natural weakness, contributing relatively little understanding to the dynamism of either firms or markets (Arend & Bromiley 2009, Roberts & Eisenhardt 2003, Vermunt & Georg 2002). The ten-year-long investigation based on panel data from over 410 firms provides very important and significant evidence to reinforce the perspective of dynamic capabilities.

6.1 Limitations and Future Research

The analytical settings of this study in panel data analysis, ironically, contribute to its great limitation. The approach using path analysis technique on the panel dataset enhances the body of research that has largely relied upon variable designs for measuring the performance of dynamic capabilities through the procedural and managerial efficiency within and outside a firm. This methodology requires large manipulations on financial ratios so that the author employed DuPont identity. However, through this approach, what the author has indeed realized is that it narrows the scope for revealing the deeper meanings of the microfoundations of the dynamic capabilities of firms. For example, investigating CEOs' or other top managers' decision-making processes has largely been viewed as an important microfoundation of dynamic capabilities (Corner & Wu 2012, O'Reilly et al. 2009, Teece 2007). Future research may be needed to conduct observations with an interpretive scientific approach to understand how those top managerial processes relate to making decisions. This study can nonetheless operationalize GAC to represent the procedural efficiency on a cost-to-value basis for the general and administrative management aspects. Although this study has provided rigorous theoretical reasoning and meaningful basis to support the causal relationships, it is considered to be limited. Other issues, such as RDMC and MPMC in organizational processes and CRC and CMC in the market fitness family, have similar shortcomings.

Finally, although this paper addresses the generalizability by extending the research scope across various sectors, one limitation may be considered for the research context delimited within Taiwan's electronics industries. The present findings may thus be limited in the generalizability to other non-related industries or to countries or areas without a similar industrial background as the contextual background of this study. This study encourages repetition, as well as additional research into the evolutionary fitness of firms to examine the

micro levels of antecedences of dynamic capabilities and their influential consequences on performance.

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