

# The Sequential Pattern of Competitive Rivalry in Emerging Markets:

## Empirical Evidence from the Global Smartphone Industry

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### Abstract

The purpose of this study is to investigate the sequential pattern of competitive rivalry in emerging industries. Taking the smartphone industry as the target sector, this paper assesses the relationship of action sequences with firm performance. We build up panel data by extending the “matched-pair” method to include five leading smartphone manufacturers with a total global market share of around 75%. These manufacturers are Apple, HTC, Nokia, RIM, and Samsung. The results provide significant support for the proposed hypotheses. Four out of five smartphone manufacturers follow a sequential pattern of competitive rivalry, while Apple has its own way to create competitive advantage. Additionally, the results indicate that individual firms’ competitive actions have an actual focus on how they manage and expand the market. This is noted as a major feature of the rivalry in emerging industries.

**Keywords:** competitive dynamics; competition strategy; organizational performance; action sequences; the smartphone industry.

### Introduction

Austrian insights into firm strategy argue that market dynamics have a role in continuously reshaping market opportunities [1]. Observations, such as those emanating from Schumpeter, have revealed that a firm’s above normal profits can in fact be created through the occurrence of disequilibrium in industrial economies in light of the distributive rules of innovation, entrepreneurs and action [2] [3] [4] [5]. In competitive environments, a firm’s advantages thus vary turbulently, driven by endogenous elements of a firm’s actions and how its competitors react to those actions [6] [7] [8].

This notion was captured by the stream of competitive dynamics in the strategic management field. Research into action-based competition emphasizes that competitive

advantage is derived from a series of actions (with reactions) over time [6] [9]. While constant growth and advancement is what entrepreneurs are looking for [10] [11], managers undertake a long-term strategic plan by setting up, and also relying on, a series of short-term goals in order to accommodate potential changes and secure advantages in rapidly changing environments [5]. Competitive strategy is able to be perceived as a stream of dynamic processes, in which a number of maneuverings and tactics take place.

The primary focus of this study lies in how firms develop strategic actions for securing competitive performance. The analysis in this study uses three action sequences to predict a firm's competitive dynamics and its trend with regard to net income change rate. These action sequences include strategic intensity, strategic complexity and strategic unpredictability. The reason for choosing net income changes as an approach to measuring the direct (and/or actual) outcomes of a firm's operations and competitive actions in the marketplace [12] is that competitive advantage is defined as the difference between the perceived benefits gained by customers and the full economic cost of the offered products and services [13].

Through this research, we tend to extend the understanding of action-based competition beyond dyads (the "matched-pair" analysis). The panel data employed in the research includes five major leading manufacturers in the smartphone industry. During the survey period of the research, these five manufacturers had a total market share of some 75% worldwide. An overview of the recent development in the smartphone industry is sufficient to indicate that the competitive dynamics in this industry represents an emerging industry trend. Moreover, in thinking the smartphone industry that is a much relative emerging industry to other industries, the research makes a step forward to extend the view of action-based competition into emerging industries.

### **Theoretical Underpinnings and Hypotheses**

One of the purposes of exploring competitive dynamics is to understand the action-response mechanism at the interfirm level. The fundamental proposition in the competitive dynamics stream is that competitive performance is the causal result of a firm's actions and reactions [9] [14] [15]. Research into this circle tends to explore the consequences of firm-specific actions [14], especially the analysis of competitive dynamics at the action-reaction level [9]. These actions (as attacks) may be initiated by a focal firm for a specific reason or by rivals who are reacting to the actions (as responses) of the focal firm [6].

Competitive actions are, much generally, viewed as "externally directed, specific, and observable competitive moves initiated by a firm to enhance its relatively competitive position" [9] [16:377-378] [17:163]. To conceptualize this viewpoint, Ferrier and Lee [17] categorize competitive actions into four action moves: strategic intensity, strategic complexity, strategic unpredictability and strategic heterogeneity. Strategic intensity is the extent to which a firm's strategy implementation involves a number of competitive actions in

succession. Strategic complexity represents the degree to which a firm's action sequence involves a diversity of competitive actions. Strategic unpredictability is measured as the degree of dissimilarity between two sequential competitive actions. Strategic heterogeneity is defined as the dissimilarity of competitive actions between the focal firm and its rival [16] [17].

By employing these four action moves, Ferrier and Lee [17] create a framework to investigate the sequential patterns of these competitive actions on stock market returns. The theoretical foundation of this framework is integrated by two risk related perspectives in the management literature, namely, action risk and decision risk. Both of them together comprise the total risk of firms [17].

The framework of the research is in the same vein as that of Ferrier and Lee [17]. However, the current research argues that the sequential patterns of competitive actions undertaken by a focal firm may not follow the theory of "total risk," which depicts the relationships between competitive actions and firm performance as the "implicitly summing" of action risk and decision risk [17:167].

First, it is obvious that the perspective of total risk for modeling abnormal returns can be summed, only if each of the independent factor pairs in the action risk and the decision risk models uses the same measurement basis [18]. Considering risk, either action or decision, as a proxy for competitive action sequences does not mean that they both contribute to the variation of abnormal returns at the same level. If the impact levels of action risk and decision risk on abnormal returns do not match the same scale level, the depiction of total risk as the summation of action risk and decision risk will be too exaggerated, and will not exhibit a definite "U-shaped" structure for "hypothesizing" the relationship between competitive actions and firm performance.

Thus, when the "U-shaped" structure in the total risk model is used to estimate the effects of competitive actions on abnormal returns, it is unknown whether a positive "U" or a negative "U" is gained. Therefore, the "implicitly summing" technique to create the total risk model may not be possible. That is, the total risk model is unable to be directly gained by "summing" action risk and decision risk. Therefore, the hypothesized pattern of competitive actions on firm performance needs to be independently reassessed.

In seeking competitive dynamics, including the sequential patterns and consequences, most of previous studies could only identify the pattern of strategic complexity, and yet, there were hardly the consistent patterns among them. For example, Miller and Chen [19] [20] and Ferrier, Grimm and Smith [16] found that the pattern of strategic complexity is in positive linear equation. Ferrier and his colleagues [17] [21] learned that the pattern of strategic complexity follows a "U-shaped" curvilinear form on market performance. They tended to remap the pattern of strategic complexity in a negative linear equation [22] [23].

## **Hypotheses**

The research uses competitive actions as building blocks for assessing the relationship of competitive actions with firm performance. We predict that the relationship of the focal firm's competitive dynamics with performance will present a quadratic functional form. When a positive equation appears as action risk dominates the focal firm's performance and competitive dynamics formula, while this equation may be negative since decision risk plays a major role in the focal firm's competitive dynamics. These competitive dynamics are strategic intensity, strategic complexity and strategic unpredictability.

For the focal firm's action sequences in strategic intensity, Ferrier and Lee [17] predicted its consequences on the focal firm's market performance that appears a "U-shaped" equation. This curvilinear relationship assumes that the focal firm's strategic intensity might be a factor generating the effects of "pull and push" on performance according to the "summing" results of action risk and decision risk [17]. However, a firm's aggressiveness of response to market opportunities and the moves of rivals is critical to antagonize dynamic competitive interaction in contemporary markets [1] [8]. In fact, "competitive aggressiveness reflects the intensity of a firm's efforts to outperform industry rivals, characterized by a combative posture and a forceful response to competitor's actions" [24:431). On one hand, the intensity level of the actions taken by the focal firm may be low if it is confronted by simple or weak actions from the rivals. On the other hand, if the level of a rival's action is high, it may respond aggressively. Moreover, when the focal firm acts and/or reacts, it would largely possess awareness of the internal resources states to ventures with rivals' moves and competitive uncertainty. Although this responding mechanism to the environmental dynamics may yet be viewed as rigidly structured, it is sensible and also it largely reduces decision risk.

The research thus notes that the focal firm's action sequences in strategic intensity will be majorly dominated by action risk. We predict that the relationship between the focal firm's action intensity and performance will appear in a positive curvilinear development. That is, the focal firm's performance appears a downward trend when the level of strategic intensity decreases, but also the focal firm's performance increases when the level of strategic intensity increases.

*Hypothesis 1: Primarily dominated by the scheme of action risk, the focal firm's strategic intensity will contribute to its performance in a positive curvilinear (quadratic) relationship.*

With regards to the competitive dynamics of strategic complexity and strategic unpredictability, the research proposes that their relationships with the focal firm's performance represent a negative curvilinear equation. In reviewing the definitions of strategic complexity and strategic unpredictability, the fundamental nature of these two competitive dynamics refers to the action repertoires, including product, pricing, promoting, service, strategy and signaling actions [16] [17] [21]. It has been argued that any integrations of these actions can be systematically implemented in order to respond to the environmental

dynamics, such as product qualities, styles, size, color, packaging, pricing, and so on [25]. These integrations that are actually referred as to strategic complexity and strategic unpredictability are either tactical or strategic actions decided by the firms themselves. For example, Firms that take strategic complexity and strategic unpredictability move in the market can deploy either a narrow range of moves or a wide range of attacks. This is in fact reflective of how complex and unpredictable a firm's acting strategies are which they are deliberately executed [26].

Previous studies into this area argued that maintaining a positive relationship between increasing levels of strategic complexity and unpredictability with performance is the key to obtaining and sustaining a winning pioneer position in dynamic competition [16] [19] [20]. However, a review of the competitive dynamics literature suggests a potentially negative relationship between increasing levels of strategic complexity and unpredictability with a firm's superior performance [22] [23]. For example, focusing on how managers leverage resources in making decision for enacting strategies, the relationship between strategic complexity and competitive advantages is proposed to be dependent on decision risk, in regard to its determinant role in affecting firm performance in a rapidly changing market [22]. This is especially true for an emerging market, where a negative relationship between strategic complexity and performance may exist as firm-specific ambiguity reduction determines the awareness of how to allocate necessary resources for competitive actions [23].

Actually, action sequences with higher levels of complexity and unpredictability need more comprehension, as well as consensus and complex decision-making procedures [24]. Nevertheless, a high level of complexity or unpredictability of action sequences is actually associated with a higher level of decision risk related to decision-making speed and quality. Thus, this research predicts that both strategic complexity and strategic unpredictability actions will affect firm performance in a negative curvilinear form due to the potential decision risk in the competitive market.

*Hypothesis 2: Primarily dominated by the scheme of decision risk, the focal firm's strategic complexity will contribute to its performance in a negative curvilinear relationship.*

*Hypothesis 3: Primarily dominated by the scheme of decision risk, the focal firm's strategic unpredictability will contribute to its performance in a negative curvilinear relationship.*

## Methods

### Analyses

The research conducts structured content analysis to investigate the nature of competitive behavior in the global smartphone industry. The research context is a news bank provided by a third party news provider, *Digitimes*, without bias or preference towards any firms (phone makers) in the smartphone industry. The extracted news is put into a quantifying process to gain the quantitative panel data (undertaken with Nvivo 9). This panel was collected for the time series analysis at the second stage of the analysis (undertaken with eViews 7).

### *Sample and data collection*

The data period of the contextual news recorded for the analysis was from April of 2009 to the end of 2012. During the survey period of the research, we deliberately set the research scope to the smartphone sector with the world's five smartphone makers as the panel. These five leading smartphone companies – Apple (Apple Incorporation, with a market share of 19%), HTC (High Tech Computer Corporation, 8.9%), Nokia (Nokia Corporation, 15.7%), RIM (Research in Motion Limited, 10.4%), and Samsung (the Samsung Group, 19%) – contributed in total to a very high market share, some 75%, in the global smartphone market during the period when the survey was being conducted, according to the report available from IDC (International Data Corporation) Worldwide Mobile Phone Tracker (February, 2012).

The research collected 1,353 news articles associated with the global smartphone industry. In these new articles, there were some 2139 actions, and of which 704 action sequences were identified from the news data bank available from *Digitimes* in Taiwan (accessible from <http://www.digitimes.com.tw>). *Digitimes*, as known for the biggest media company in Taiwan, provides worldwide daily IT news, both in newspapers and websites, for industry professionals, channel players, investment analysts and media around the world.

Within the survey period, the research also collected financial information pertaining to net profits from the US Securities and Exchange Commission (SEC), Wharton Research Data Services (WRDS) and Market Observation Post System (MOPS). The data was collected to provide financial information in terms of net incomes and the actions (reactions/responses) that were taken by the five leading smartphone companies in this study.

### Dependent variable

In the strategy field, the competitive dynamics stream tends to argue that the improvement of firm performance is the causal result of a firm's strategic actions and reactions (or a series of strategic actions and reactions) within the market [9] [14] [15]. The

research uses the accounting measurement, the change rate of net income calculated on the basis of the monthly sum, as a dependent proxy to measure firm performance [12] [13].

### **Independent variables**

Following Ferrier and his colleagues' research [16], this paper identifies three major characteristics of competitive actions to model the potential pattern of competitive dynamics in the smartphone industry. These three major action characteristics are strategic intensity, strategic complexity and strategic unpredictability. In addition, in line with the proposition of the research, the independent variable set for each of these competitive action characteristics was developed in a quadratic manner.

### **Control variables**

The trending effects were measured and included as a set of control variables in our longitudinal analysis. It has been suggested that to decompose a time series, a usual and practical approach is to assume an additive model involving trend, seasonal, and cyclical patterns [27]. By observing the time plot of the net income series of the targeted companies, the research obtained the data series that present a potential quadratic trend form over time. Thus, it controlled for the trending effects in a quadratic form.

## **Analysis and Results**

Structured content analysis was initially used to create a longitudinal panel for the smartphone industry over the period from April 2009 to December 2011. In the second stage, this data panel was used to conduct time series analysis for the test of the proposed hypotheses.

First, the research then conducted the BLUEness analysis to assess each model's specification. In general, the test results (listed in Table 1, the list of BLUEness diagnoses) showed that four out of five models were considered to meet the criteria of BLUEness according to the rules of the classical linear normal regression model (CLNRM). The HTC model, nevertheless, might not be BLUE due to the probable presence of heteroskedastical errors. To enhance the robustness of the HTC model, the research employed the corrective method of "White Heteroskedasticity-Consistent Standard Errors and Covariance" to reduce the level of the standard errors of the estimates.

Table 1 also reports the regression results for the proposed hypotheses. According to these results, *Hypotheses 1, 2 and 3* gained significant supports from the models of HTC, Nokia, RIM and Samsung, while the Apple model showed that the sequence pattern of Apple's competitive dynamics is different from those of the others.

*Hypothesis 1* presents the relationship of sequence actions of strategic intensity with firm performance of being a positive curvilinear form. The test results support *hypothesis 1*.

In the HTC, Nokia, RIM and Samsung models, all tests relating to the competitive dynamics of strategic intensity are significant at 5% significance level.

Table 1: The results of the model assessment and hypothesis test

Variables/Models	APPLE	HTC	NOKIA	RIM	SAMSUNG
Time	-1.84*	-0.44*	-2.04*	0.16 <sup>†</sup>	-0.04
Time (squared)	0.12 <sup>†</sup>	0.04*	0.12*	-0.01 <sup>†</sup>	0.32*
Strategic Intensity	-0.50	0.80*	-2.74*	1.70*	1.71*
Strategic Intensity (squared)	0.63	0.87*	1.06**	1.48*	2.52**
Strategic Complexity	0.42	1.22*	0.25	0.04	0.68 <sup>†</sup>
Strategic Complexity (squared)	-0.68	-1.24*	-0.79 <sup>†</sup>	-0.89*	-1.13*
Strategic Unpredictability	0.52	1.12*	1.15*	0.36 <sup>†</sup>	0.49 <sup>†</sup>
Strategic Unpredictability (squared)	-0.33	-1.39**	-0.26 <sup>†</sup>	-0.47*	-1.18*
Seas_2	3.62*	0.12	0.06	-0.03	0.28
Seas_6	1.72 <sup>†</sup>	0.28 <sup>†</sup>	0.85	0.02	0.85
Seas_10	4.02*	-0.33	0.78	-0.42 <sup>†</sup>	1.54 <sup>†</sup>
BLUeness Diagnoses					
Ramsey RESET ( <i>p</i> -value)	0.28	0.33	0.56	0.10	0.74
DWTS	1.88	1.78	2.15	1.98	2.26
The Breusch-Godfrey LM (BGLM) at 2 <sup>nd</sup> lag and 3 <sup>rd</sup> lag ( <i>p</i> -value)	0.18/ 0.19	0.23/ 0.17	0.56/ 0.47	0.10/ 0.32	0.18/ 0.29
JBTS ( <i>p</i> -value)	0.48	0.94	0.47	0.74	0.42
WHITE ( <i>p</i> -value)	0.32	0.03	0.42	0.07	0.18
Adjusted R-squared	0.76	0.97	0.96	0.92	0.84
F-statistic	13.11*	44.79**	35.58*	15.62*	35.58**

Note:

Sampling period: April 2009 ~ December 2011 (33 months).

The values of Significance of estimates reported are based on a two-tailed test with notations: <sup>†</sup> ( $p < 0.1$ ), \* ( $p < 0.05$ ), \*\* ( $p < 0.01$ ).

For each model, the dependent variable is the net income change rate.

Seas\_2, Seas\_6 and Seas\_10: the seasonal effects at February, June and October within the survey years.

All independent variables except "Time" are standardized figures.

*Hypothesis 2* represents the nexus between a firm's strategic complexity and its performance with a pattern in a negative curvilinear relationship. The empirical results provide partial support for *hypothesis 2*. Empirical support from HTC (strategic complexity = 1.22,  $p < 0.05$  and strategic complexity<sup>2</sup> = -1.24,  $p < 0.05$ ) and Samsung (strategic complexity = 0.68,  $p < 0.10$  and strategic complexity<sup>2</sup> = -1.13,  $p < 0.05$ ). For the Nokia and RIM models, partial support is gained with respect to the insignificant estimates of the first power items of strategic complexity at 0.25 (Nokia) and 0.04 (RIM).

*Hypothesis 3* conceptualized the pattern of a firm's strategic actions in terms of strategic unpredictability for its relationship with firm performance. Like strategic complexity, the focal firm's strategic unpredictability exhibited a negative curvilinear relationship with firm performance. For the test on the target firms (excluding Apple), *Hypothesis 3* gains fully support from the empirical results.

For Apple, the present model shows a different pattern from the other models. Most of the independent variables appear statistically insignificant. Also, at a significance level of 0.1, the present model shows a pattern that blends with trending effects (time = -1.84,  $p < 0.05$ ; time<sup>2</sup> = 0.12,  $p < 0.1$ ) and seasonal effects on Februarys (3.62,  $p < 0.05$ ), Junes (1.72,  $p < 0.1$ ) and Octobers (4.02,  $p < 0.05$ ), during the sampling years.

## Discussions

The goal of this paper has been set to seek the pattern of competitive dynamics in the smartphone industry. The research has identified that the relationship between the focal firm's competitive dynamics and its economic performance mainly appears a curvilinear equation from five leading smartphone makers in the industry. The present findings provide substantial support for understanding the nature of competitive dynamics, including strategic intensity, strategic complexity and strategic unpredictability, and their contributions to organizational performance in an emerging industry.

On inspection of the competition pattern in the smartphone industry, it was found that HTC, Nokia, RIM and Samsung share the same nature of competitive dynamics. The present analysis suggests that their competitive moves for market competition have foci on each of the aspects of competitive dynamics, namely strategic intensity, complexity and unpredictability. As we investigated, HTC, for example, tends to use the so-called "machine sea strategy" to dig more market share in the smartphone industry. Hence, HTC tends to enhance its performance formula by using product strategies to attract customers by providing many product types in various market segmentations. Such the strategy could also be observed in Nokia, RIM and Samsung by looking at their product lines in the market.

This so-called machine sea strategy in high measure reflects the competitive dynamics with a strategic scheme according to strategic intensity, complexity and unpredictability. The fundamental nature of these competitive dynamics, as it has been noticed in the research, refers to action repertoires, including product, pricing, promoting, service, strategy and signaling actions [25]. Of these action categories, any integration, such as quality, styles, size, color, packaging, and marketing activities, in fact are viewed as a critical element to implement machine sea strategy.

While HTC, Nokia, RIM and Samsung share the common pattern of competitive dynamics in the smartphone industry, in our investigation, Apple distinguished itself in this sector. The present findings reveal that Apple's economic performance may only be able to be explained by time trend effects and seasonal effects (in Februarys, Junes and Octobers during the sampling years), but not by the effects of the proposed competitive actions. The present results of the Apple model demonstrate the extent to which Apple might not be influenced by the competition in the smartphone industry. It rather seems that Apple tends to perceive the market trend and lead the role in the industry by acting in innovative and creative ways.

Apple has always intended to lead the industrial trend by advocating for the advancement of technology through creative and innovative products and applications. For example, to develop new applications on iPhone, as the iTunes and later the App, Apple has defined a new platform for sharing digital content on the Internet. Actually, through this, Apple paved a new way to use MP3 devices and mobile phones.

Different from Apple's operations, other smartphone makers have pushed various products into the market in order to compete to Apple's leading status. As we noted before, this maneuver is about the so-called machine sea strategy. Actually, most of the smartphone vendors tend to employ this strategy. Especially, when Google uses its Android operating system to lead most of smartphone hardware makers (HTC and Samsung) to compete Apple's iPhones (with its i-OS) in the smartphone industry. While RIM and Nokia are considered as an outsider of the Google campaign, RIM's BlackBerry series (i.e. Bold, Torch, Curve and Storm) and Nokia's smartphone offerings in a super wide range have actually tended to cover the whole range of the market segments. The research might also note that RIM and Nokia hit machine sea strategy to manage their global market share.

### **Conclusions**

With empirical evidence, the research has identified a potential sequence action scheme by which a firm competitive performance is depicted. The research primarily based upon the previous research of Ferrier and Lee [17] into competitive dynamics has assessed the sequential pattern of competitive rivalry and its consequences in the smartphone industry. The present evidence offered by the research to illustrate the smartphone market reality is significant. It has presented that the focal firm's competitive dynamics, including strategic intensity, strategic complexity and strategic unpredictability, will contribute to the firm's performance in a curvilinear equation. With these significant findings, our views may contribute to the competitive dynamics stream in the field of strategic management.

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