FACTSET

White Paper

Batman and Robin or Superman: How CEO/COO Duos Impact Firm Performance

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"Without her, we would just be incomplete." -Mark Zuckerberg Facebook CEO about Sheryl Sandberg COO (Stone, 2011)

"Mark Hurd is nothing more than a figure head at the company. He has no power or influence and is mocked on almost a daily basis." – Employee comments about COO of Oracle Mark Hurd (Bort, 2012)

Top managers have been a topic of significant interest in strategic management research since these managers are the architects and implementation leaders of the firm's strategy (Finkelstein, Hambrick, & Cannella, 2009). Recent research has shown that top corporate leaders, specifically CEOs, have a significant and increasing influence on firm performance (Quigley & Hambrick, 2015). Typically rooted in the upper echelons perspective, strategy researchers have argued that the configuration and background of top executives play an important role in the effectiveness of firm strategies (Hambrick & Mason, 1984). Recently, this stream of research has investigated how the presence of certain chief officers, with functional specific roles, such as the chief financial officer (CFO), chief marketing officer (CMO) and chief operating officer (COO) relate to the effectiveness of firm strategies (Cannella, Park, & Lee, 2008; Menz, 2012).

COOs are of particular interest because they often represent the second highest ranking executive (Hambrick & Cannella, 2004), they can reduce the power distance within top management teams (TMT) (Zhang, 2006) and their salary can represent a significant additional cost. Typically tasked with the operational aspects of the business, COOs are responsible to maintain the efficiency and effectiveness of the firm's overall processes. Based on these responsibilities the COO can play an important role in the implementation of the firm's strategies.

To date, research has suggested that COOs play an important role because they enable CEOs to deal with enhanced task demands (Hambrick & Cannella, 2004) and help to integrate the effort of top management teams (Marcel, 2009). Moreover, COOs have been shown to have specialized knowledge that enables their contribution to the performance of other firms on which they serve as external directors (Krause, Semadeni, & Cannella, 2013). However, the implications for COOs on their own firm's performance remains unclear with prior research exhibiting sharply conflicting findings. For example, COO prone CEOs have been shown to be associated with lower firm performance (Hambrick & Cannella, 2004) while other research has suggested that the presence of COOs is associated with higher performance (Marcel, 2009).

In order to reconcile these conflicting findings, we develop theoretical arguments about when COOs will offer value and draw on novel data on fine-grained organizational changes that allows us to test our theoretical arguments. Theoretically, we argue that the value of having a COO is likely to vary depending on the operational demands a firm faces. In situations where the firm is facing stressful operational demands, having a COO facilitates a clear separation of responsibility between the CEO and the COO. The CEO is able to focus on longer term strategic issues while the COO focuses on maintaining the firm's internal operations. In contrast, when the firm does not face challenging operational demands, the COO may simply add an additional layer of management and cost to the organization that is not needed. At the extreme, with no need for an individual focusing on firm operations, the particular responsibilities and authority of the COO may be unclear, raising the potential political infighting and a lack of central leadership. Therefore we argue that, in general, COO presence is likely to be negatively associated with operational effectiveness. However, we qualify this main effect and suggest that COOs are more likely to enhance operational effectiveness when the firm faces complex operational challenges, such as a significant change in suppliers, customers, or product lines. The complex operations often lead to firms facing operational tensions, such as the need to maintain efficiencies while making significant changes. Under such conditions, firms may benefit from the attention of a COO, an executive with authority to make decisions, expertise and social capital to reconcile internal differences and sufficient autonomy to allocate necessary resources.

Second, empirically we suggest that the conflicting findings regarding the effectiveness of COOs is partially a result of the limitations inherent in Compustat and other commonly used measures of an organization's operations. To more specifically assess organizational changes, we utilize a unique dataset assembled by FactSet which measures strategic suppliers, customers and products as publicly disclosed by the focal firms in 10k's, press releases, and disclosures. Thus, through the use of this unique dataset we more closely ascertain the types of organizational change actions being implemented by the firm.

In considering these factors we make two contributions to the strategy literature. First, by utilizing an operational perspective on the COO dilemma we offer insight on conflicting prior results regarding the value of having a COO. Specifically we suggest while COO presence is likely to, on average, inhibit firm performance, we also argue and show that this effect is contingent on the operational demands the firm faces. Second, we are able to offer new insights on the role of COOs since our data set allows us to directly assess the operational challenges a firm faces. FactSet compiles data on fine-grained measures of the operational characteristics of firms. With their data, we are able to directly measure the changes the firm undertakes in its operations across its value chain, from primary the suppliers it uses, the products it produces, and finally to the primary customers to which it sells. With this data, we can assess the dynamic operational changes the firm is dealing with.

Hypothesis Development COO Main Effect

The upper echelons perspective suggests that heterogeneity in firm strategy and performance is the result of differences among top managers (Hambrick and Mason, 1984; Hambrick, 2007). In particular, that differences in top manager's functional background and personal experiences influence how they prioritize and evaluate information. Among the mechanisms influencing the effectiveness of top managers is the composition of the top management team and the resulting impact of divisions between these executives. Arguments around the effectiveness of COOs suggests that benefits can arise from prompting strategic change (Zhang, 2006) enhancing information processing routines of top management teams (Marcel, 2009), and enabling top executives to deal with increasing task demands (Hambrick & Cannella, 2004). Other work argued that having a COO, "draws a structural distinction between strategy formulation and implementation [and] adds an organizational layer" (Hambrick and Cannella, 2004: 959). COOs are often tasked with implementing firm strategy therefore separating the CEO from the responsibility of implementation.

Effective firm strategy often requires an interplay of strategy formulation and implementation such that firms can quickly adjust to environmental feedback. For top managers this often necessitates access to more information and rigorous

decision making (Eisenhardt, 1989). The presence of a COO may direct relevant and important internal information away from the CEO (Charan & Colvin, 1999; Marcel, 2009; March & Simon, 1958). Because the COO is responsible for internal operations this responsibility may inhibit the CEOs access to necessary information while the COO handles these responsibilities. Therefore when a COO is present she becomes an internal knowledge broker to the rest of the management team. Reduced access to internal information could weaken the formulation and implementation link thus lowering the firm's ability to adapt to its environment and benefit from feedback.

Having a COO may also weaken firm performance by creating organizational ambiguity regarding the role of the CEO. Separating leadership roles among the CEO and COO may undermine the function of the CEO as the focal leader which may diminish the CEO's locus of control, leading to political infighting and scapegoating (Abelson 1999; Boeker, 1992; Shaver, 1970). Without a COO, a CEO can serve as both the key internal and external chief officer with responsibility for and access to all necessary information and resources. However by delegating operational responsibilities to a COO, the CEO may raise questions regarding the CEOs interest in and capability to fulfill specific operational leadership roles (Murray, 2000). Thus, by separating the key management responsibilities, the role of the CEO as the key strategic figure may be significantly lessened.

Finally, unlike other executive roles, such as the CMO or CTO where the responsibilities and tasks are largely defined by the executive's title, the COO frequently has no natural functional area which may lead to role ambiguity. The tasks of the CMO are largely clear, such as the sales, distribution and branding of the firm's offerings (Nath & Mahajan, 2008). Similarly, the CTO has responsibilities around the key technology tasks in the firm such as infrastructure and key information (Medcof, 2008). In contrast, the COO is not strongly associated with any particular business function or tasks. Thus, allocating tasks to the COOs can be less clear. For example, is the COO responsible for making decisions regarding product line changes or is this the role of the CEO? This role ambiguity may weaken the executive's ability to effectively prioritize divide tasks (Rizzo, House, & Lirtzman, 1970). Increased role ambiguity may lead greater social conflict, weakened information processing and decision making (Pelled, Eisenhardt, & Xin, 1999).

All of these arguments highlight significant potential costs of having a COO. Thus, we start with the following baseline hypothesis.

Hypothesis 1: The presence of a COO is negatively related to performance

The Moderating Effect of Operational Challenges

While we believe that COOs are unlikely to benefit firms generally, their potential benefits are likely to be greatest when the firm faces operational challenges or changes.Implementing operational changes can be a significant challenge for top executives because of the difficult tradeoffs to be made between maintaining operational efficiency while simultaneously transitioning the firm's operations – what we refer to as operational tension.

In order to effectively manage this operational tension, firms may benefit from the additional human and social capital COOs can offer the firm. Human and social capital refers to the knowledge, skills, abilities and relationships top managers can bring to bear on strategic issues (Becker, 1964; Hillman & Dalziel, 2003; Nahapiet & Ghoshal, 1998). Because of their close relationship with operational factors of the firm, COOs can enhance the human and social capital available to top executives when implementing operational changes. These factors may include relationships with key suppliers and employees necessary to manage unique firm routines, changing product lines and managing changes in the supplier base. In these situations the operational knowledge and expertise of a COO is particularly useful to navigate the uncertainties, to reconcile differences and make necessary implementation decisions to reach the firm's long term goals (Miller, Burke, & Glick, 1998).

The ambiguous nature of the COOs task domain serves an important role in firm strategy for firms executing operational changes. In these situations, the presence of a COO can enhance coordination and information sharing among the top

executives (Amason & Sapienza, 1997; Marcel, 2009; Schweiger, Sandberg, & Rechner, 1989). Because COOs are typically charged with the operations of the organization this leads the COO to be involved in many of the firm's functions. Operational tension, the difficulty of balancing needs for operational efficiency during times of complex operational changes, requires rich decision making processes and approaches in order to reconcile conflicting approaches. By assigning tasks and responsibilities to a COO relative to other potential top executives the firm is more likely to flesh out responses that are necessary to reconcile competing needs (Amason & Sapienza, 1997; Schweiger et al., 1989).

These interconnections lead COOs to have relationships and information from across the firm which can be brought to bear in the management process.

Hypothesis 2a: The negative relationship of COO presence and performance is moderated by degree of strategic distinctiveness such that the relationship is less negative when strategic distinctiveness is high than when it is low.

Hypothesis 2b: The negative relationship of COO presence and performance is moderated by degree of change in the firm's product line such that the relationship is less negative when product line change is high than when it is low.

Hypothesis 2c: The negative relationship of COO presence and performance is moderated by degree of change in the firm's supplier base such that the relationship is less negative when supplier change is high than when it is low.

Hypothesis 2d: The negative relationship of COO presence and performance is moderated by degree of change in the firm's customer base such that the relationship is less negative when customer change is high than when it is low.

Methods

Sample

Our sample is all firms listed in the S&P 1500 firms, an index designed to reflect the broad U.S. equity market (Standard & Poor's 2010) between 2003 through 2012. Data was gathered from several sources including the Execucomp and Compustat databases. Operational change measures were drawn from FactSet data. FactSet systematically collects information regarding the strategic relationships such as supplier and customers as well as information about the types of products offered by the focal firm. This information is drawn from primary public sources such as 10-k filings, investor presentations and press releases and compiled by firm.

Each relationship and product indicates the date each began and, when appropriate, ended along with information about the particular partner and product. Our final sample includes 1,134 firms and a total of 7,806 firm-years.

Dependent Variable:

Performance (Operational Effectiveness). Our research question focuses on the role of COOs in impacting firm performance. Prior research has suggested that operational effectiveness, measured by industry adjusted ROA, is an appropriate measure for calculating firm performance when considering the impact of operationally focused COOs (Krause et al., 2013). As such, we use industry adjusted ROA which is calculated as net income divided by total assets and then subtracting the industry average ROA (Zhang & Rajagopalan, 2010).[1] To separate the independent and dependent variable temporally we regress all independent variables in year (t) on performance in year (t+1) in all our models.

1 Because our analysis includes a large sample covering extreme environmental conditions there were a number of firms reporting extreme values in ROA. After identifying these extreme values we found that a number of these firms dissolved and sold their assets which resulted in extreme values. In order to avoid having these extreme values unduly impacting our analysis we removed any firms which reported greater than 1 or less than -1 ROA for more than 2 years (10 firms). We removed only year reports from firms with 2 or fewer years of ROA reports greater than 100% or less than -100% (56 firm-years were removed) (McGahan & Porter, 1997; McNamara, Vaaler, & Devers, 2003).

Independent Variable

COO. We followed prior literature that COOs are identified as an executive other than the CEO who holds the title of COO or president and primarily served as COO rather than an heir apparent (Hambrick & Cannella, 2004). Using the title indicator in Execucomp we coded COOs based on the following criterion: First, all COOs which were not COOs of particular divisions were coded as COOs. Second, all executives with the title "president" were also coded as COOs. To distinguish COOs from heir apparents we used the four year rule (Hambrick & Cannella, 2004; Marcel, 2009; Zhang, 2006) which designates any COO who is more than 4 years younger than the CEO as an heir apparent and not included as a COO. This rule builds on the arguments of Hambrick and Cannella (2004) who point out that boards of directors consider potential tenure when selecting heir apparents and would be less likely to designate an heir apparent who could serve less than four years.

Hypothesized Moderator Variables

Strategic Distinctiveness. To measure strategic distinctiveness we followed past research by calculating the deviation of the allocation of firm resources across 5 different categories. Within each 4 digit SIC industry the top 5 firms were identified and their resource allocation were averaged across advertising intensity (advertising/sales), research and development intensity (R&D/sales); plant and equipment newness (P&E/Gross P&E); non-production overhead (selling, general and administrative [SGA] expenses/sales) inventory levels (inventories/sales); and financial leverage (debt/equity) to establish an industry norm. We then took the absolute value of the difference of the focal firm from the calculated industry norm. These values were then summed and standardized. When a firm allocates resources in a very similar way to the industry norm their strategy is likely to be less distinct than when resource allocation is very different from the industry norm.

Product Line Changes. FactSet data includes fine-grained data on product line changes, as well as firm suppliers and customers as we will discuss in the following paragraphs. For product lines, they include the initial offering and removal dates for each of the firm's products. The presence of a new product and the removal of a specific product were calculated by year and summed. Thus product line changes includes both new products and the removal of past products.

Supplier Changes. We calculated supplier changes as the total number of new or ending supplier relationships disclosed each year.

Customer Changes. We calculate the number of new or ending suppliers disclosed each year.

Control Variables

Because of our interest in firm performance we sought to control for other potential explanations for firm performance. *Firm size* can influence a firm's market power and ultimately its financial performance. We included firm size measured as the log (sales+1). Slack can also play an important role in both firm performance as well as how firm's seek to execute complex strategies. Therefore we included four forms of firm slack namely *absorbed* (SG&A/sales)*, potential* (debt/total assets) (Kim & Bettis, 2014)*, recoverable* (inventory/sales) (Bourgeois & Singh 1983; Steensma & Corely 2001) and *available slack* (cash/assets). We also included year dummies. We also include year dummies to remove variation due to differences arising from general economic trends.

Analysis

Because COO has little within-firm variation we utilize a random effects regression to utilizing both within and between firm variance to estimate the hypothesized relationships.

Results

We report the descriptive statistics and inter-correlations for the variables in this study in Table 1. The descriptive statistics and correlations are largely in line with expectations. Specifically, there is a large correlation between performance and previous performance (*r=.62)*. Furthermore there are some significant correlations among the different measures of slack. The results of the random-effects regression analysis predicting operational effectiveness is reported in Table 2. These results largely support our theory.

Model 1 includes the control variables as well as predicted moderator variables. As expected, several of these variables are significant predictors of operational effectiveness. First, the prior year's operational effectiveness was positively associated to the current year's operational effectiveness (*p < .001*). Further *absorbed, potential* and *available slack* were positive and significantly related to *operational performance* (*p<.05, .001, .001* respectively). Finally, as expected *strategic distinctiveness* is negatively related to *operational effectiveness (p<.001)* which is in line with previous research which suggests that strategically distinctive companies can often find it difficult to be perceived as legitimate in securing outsider resources (Deephouse, 2000; McNamara, Deephouse, & Luce, 2003).

Hypothesis 1 argued that the presence of a *COO* is negatively related to *operational effectiveness.* In order to test this hypothesis we included the *COO* dummy variable in Model 1.

The coefficient is negative and statistically significant (*p<.001*) which offers support for Hypothesis 1. In our development of Hypothesis 2 we argue that the negative relationship between *COO presence* and *operational effectiveness* is moderated by operational tension. Specifically we argue that the negative relationship we be weaker when the firm faces operational tension in the form of higher *strategic distinctiveness, more product line changes, supplier changes and customer changes.* In order to test this hypothesis we include the product of the *COO* dummy and measures of operational tension in Model 2. The results largely support our hypothesis. First, the product coefficient for *COO* and *strategic distinctiveness* is positive and statistically significant (*p<.05*) suggesting that the negative relationship between *COO* and *operational effectiveness* is weakened as *strategic distinctiveness* increases, supporting Hypothesis 2a. This relationship is illustrated with Figure 1 which plots the relationship between *COO presence* and *operational effectiveness* at levels of *strategic distinctiveness* two standard deviations below and above the mean in the sample. The plot illustrates that at low levels of *strategic distinctiveness COO presence* is negatively related to *operational effectiveness,* but that at high levels of *strategic distinctiveness COO presence* is less negative and even positively related to *operational effectiveness.*

To test Hypothesis 2b, we include the product of *product line changes* and *COO presence.* Like *strategic distinctiveness* this coefficient is positive and statistically significant (*p<.01*), supporting our hypothesis. This relationship is illustrated in Figure 2. To test Hypothesis 2c and 2d, we also include the product of *supplier changes* and *customer changes* in Model 2. While the coefficient of *supplier changes* and *COO presence* was significant (*p<.05*) and is illustrated in Figure 3 the coefficient for *customer changes* and *COO presence* was not significant. Thus, we found support for Hypothesis 2a, 2b and 2c but not 2d.

In summary the results in Model 2 largely support our moderation hypotheses which argue that the negative relationship between *COO presence* and *operational effectiveness* is moderated by operational tension such that the relationship is weaker as operational tension increases.

Discussion

Building out of the upper echelons perspective, top managers have been of significant interest to strategic management researchers. In particular, recent work has emphasized how the configuration of function specific top manager roles such as the presence of a CFO, CMO and COO can influence firm strategies and outcomes.

COOs are generally tasked with strategy implementation are often responsible for the operational aspects of the firm. Notwithstanding a long stream of qualitative work on COOs and some emerging empirical work on COO presence, the relationship between COO presence and firm performance remains equivocal (Hambrick & Cannella, 2004; Marcel, 2009).

By taking an operational perspective, we seek to shed light on these conflicting findings. First, we hypothesize and find support for the argument that, on average, COO presence is likely to be related to weaker performance due to political infighting, unclear responsibilities, and a lack of central leadership. Further, we suggest that this negative relationship is weakened when the firm is seeking to implement challenging operational changes such as high levels of strategic distinctiveness as well as changes in the firm's product lines, suppliers and customers.

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Tables

Table 1: Descriptive Statistics and Inter-correlations

	Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8	9	10	11
Operational Effectiveness t+1	0.07	0.13	-0.92	0.99											
Operational Effectiveness	0.07	0.12	-0.92	0.95	0.62										
COO	0.16	0.36	0.00	1.00	-0.04	-0.02									
Strategic Distinctiveness	3.22	1.86	0.08	17.13	-0.18	-0.21	-0.02								
Product Line Change	1.03	2.70	0.00	39.00	0.01	0.01	-0.02	-0.06							
Supplier Change	0.41	1.21	0.00	18.00	0.01	0.01	-0.01	-0.02	0.01						
Customer Change	1.29	3.10	0.00	38.00	0.02	0.02	0.00	-0.04	0.03	0.12					
Firm Size	7.41	1.61	1.28	13.05	-0.02	-0.02	0.03	-0.19	0.15	0.12	-0.01				
Absorbed Slack	0.26	0.21	0.00	5.22	0.06	0.02	-0.03	0.09	-0.04	0.01	0.1	-0.38			
Potential Slack	0.49	0.23	0.03	2.59	-0.13	-0.24	0.03	0.04	0.04	0.04	-0.04	0.41	-0.20		
Recoverable Slack	0.11	0.13	0.00	3.98	-0.06	-0.07	-0.01	0.03	-0.01	-0.03	-0.09	-0.06	-0.04	-0.08	
Available Slack	0.13	0.12	0.00	0.83	0.18	0.18	-0.03	0.04	-0.06	-0.01	0.08	-0.32	0.33	-0.30	-0.06

Table 2: Random Effects OLS Predicting Operational Effectiveness t+1

	Model 1 Operational	Model 2 Effectiveness t+1
COO	-0.010*** (0.003)	-0.025*** (0.007)
COO * Strategic Distinctiveness		0.004* (0.002)
COO * Product Line Change		0.002* (0.001)
COO * Supplier Change		0.005* (0.002)
COO * Customer Change		-0.001 (0.001)
Strategic Distinctiveness	-0.005*** (0.001)	-0.005*** (0.001)
Product Line Change	0.000 (0.000)	0.000 (0.000)
Supplier Change	0.000 (0.001)	0.000 (0.001)
Customer Change	0.000 (0.000)	0.000 (0.000)
Operational Effectiveness	0.611*** (0.022)	0.611*** (0.022)
Firm Size	0.000 (0.001)	0.000 (0.001)
Absorbed Slack	0.020* (0.010)	0.019* (0.010)
Potential Slack	0.031*** (0.009)	0.031*** (0.009)
Recoverable Slack	-0.001 (0.007)	-0.002 (0.007)
Available Slack	0.088*** (0.013)	0.088*** (0.013)
_cons	0.01 (0.009)	0.013+ (0.010)
N	7806	7806
Firms	1134	1134

Figure 1: Interaction of COO and Strategic Distinctiveness

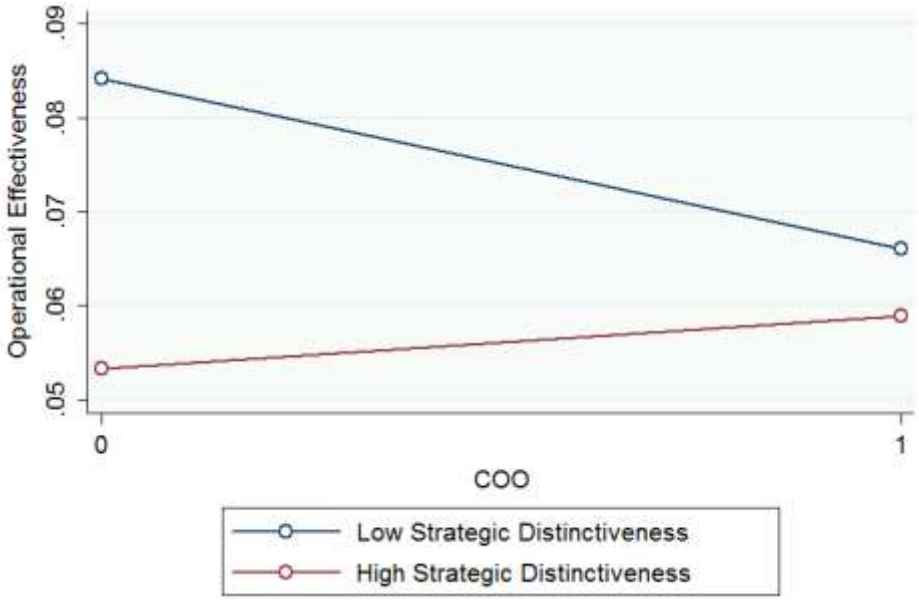

Figure 2: Interaction of COO and Product Line Change

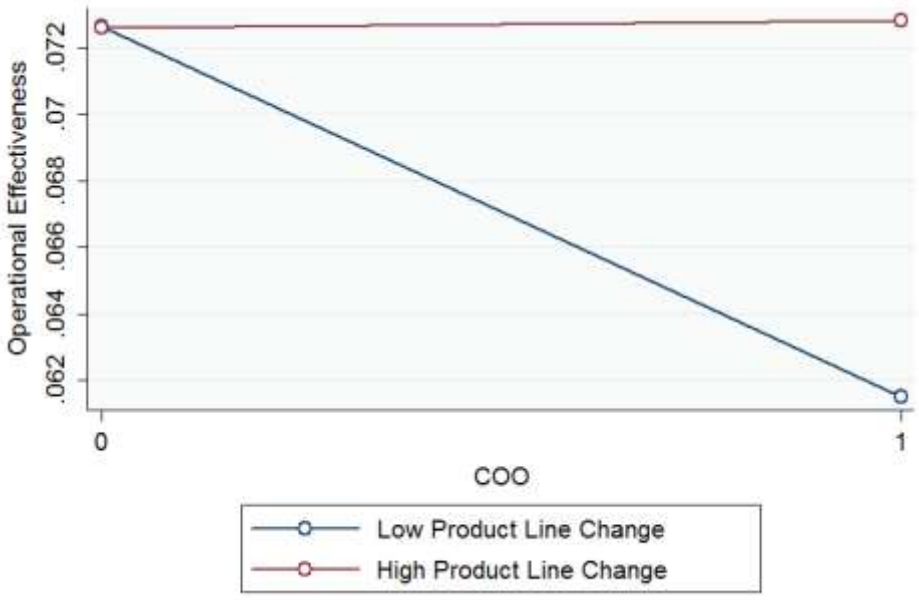

Figure 3: Interaction of COO and Supplier Base Change