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Article

Companies performance management : the role of operational flexibility

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COMPANIES PERFORMANCE MANAGEMENT: THE ROLE OF OPERATIONAL FLEXIBILITY

Abstract. The article summarizes the arguments on minimizing the uncertainty level caused by numerous unforeseen circumstances due to using operational flexibility to increase companies' efficiency (example of small and medium enterprises in the pharmaceutical sector of Iran). The research aims at investigating the relationship between operational flexibility and a company's performance to examine the impact of environmental uncertainty on these relationships. This study was conducted as quantitative. The deductive method using the synergy of systematization of scientific background on the problem and the empirical proof of the formulated hypotheses became a methodological study tool. The article provides evidence of the economic-mathematical model based on data from small and medium-sized pharmaceutical Iranian companies. The study hypotheses are as follows: 1) operational flexibility has a positive effect on the productivity of the pharmaceutical sector of Iran, represented by small and medium-sized companies; 2) uncertainty determines the relationship between the operational flexibility and efficiency of small and medium-sized pharmaceutical companies in Iran. The model constructed by the authors allowed measuring the relationship between variables using regression analysis and moderation analysis (Hayes model). The total number of companies included in the sample is 113. In turn, 228 managers of these pharmaceutical companies took part in the surveys (Iran example). The empirical analysis results showed that the mix flexibility indicator has practically no effect on companies' efficiency, and the volume flexibility and product development flexibility indicators generally have a positive effect on the performance of companies in the pharmaceutical sector. On the other hand, the environmental uncertainty indicator does not help reduce the relationship between the operational flexibility

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indicator and companies' performance in the pharmaceutical sector of Iran's economy. The study results could be useful for planning small and medium enterprises' activities in the context of improving their performance.

Keywords: flexibility, small and medium-sized company, uncertainty, performance, statistical analysis.

Introduction. Uncertainty cannot be accurately understood because it results from unforeseen circumstances. However, it is possible to reduce environmental uncertainty by using specific actions that lead to higher company performance levels (DiFonzo and Bordia, 2002). In operations management, many researchers have referred to the fact that uncertainty (UN) is a source of instability for businesses. A high degree of uncertainty would motivate companies to concentrate more and more on flexibility in the supply chain in a hyper changing business environment (Vickery et al., 1999). In this regard, flexibility at the operational level could be one of those mechanisms. Flexibility is considered an essential condition to enhance operational performance (Suarez et al., 1991; Pagell and Krause, 2003). In the context of the relationship between flexibility, uncertainty, and performance, Silva and Ferreira (2017) found that uncertainty significantly affected the company's decision to adopt flexibility because it affects operational performance. The researchers suggested using flexibility as a moderating mechanism to reduce the uncertainty effect on companies' performance. The studies (Sanchez et al., 2005; Merschmann and Thonemann, 2011) mentioned that flexibility relates to the situation's uncertainty. For example, in uncertain environments, increased flexibility positively affects and improves company performance. Furthermore, many researchers refer to the fact that flexibility has a major effect on companies' performance in an unstable environment (Volberda, 1998; Miller and Shamsie, 1996).

Much research related to flexibility and its relationship with performance has focused on financial performance. However, other non-financial performance measurements should be considered, such as customer satisfaction (Vickery et al., 1999; Lummus et al., 2005; Camison and Lopez, 2010). Regarding the relationship between operational flexibility (OF) and company performance, it is possible to identify OF as one of the features of prosperous companies. It considered one of the most important types of organizational flexibility at the operational level. It refers to companies' ability to reconfigure the available resources to offer various products to adapt and react to uncertainty and market fluctuations. As a result, it provides better performance in exceptional situations (Scherrer et al., 2014; Saenz et al., 2018; Gerwin, 1993; Slack, 2005).

Moreover, Chod and Rudi (2005) mentioned that manufacturing flexibility implementation leads to reduced costs. Thus, OF may positively affect financial performance by enhancing profitability when costs are lower. Operational flexibility has a lot of dimensions. This study considers only three of them, such as volume flexibility (VF), mix flexibility (MF), and product development flexibility (PDF).

Literature Review. VF refers to the company's ability to modify the production size and operate profitably at different production volumes as a type of operational flexibility. VF considered a mechanism to enhance performance and obtain a competitive advantage through customer satisfaction. It is not a final goal but rather a method to achieve the company's final goal (Oke, 2005). Also, many researchers have shown that VF impacts a company's performance positively (Kekre and Srinivasan, 1990; Suarez et al., 1996; Vickery et al., 1999). Moreover, it reduces demand uncertainty by controlling production size to meet demand fluctuations in urgent cases (Goyal and Netessine, 2011). It also directly affects customers' perceptions by meeting their needs at any time (Vickery et al., 1999), which would lead rationally to increased customer satisfaction.

On the other hand, mix flexibility refers to the company's ability to produce various products. As a kind of operational flexibility, MF affects the profitability and market share of a company positively (Kekre and Srinivasan, 1990; Suarez et al., 1996). In addition to this, (Kekre and Srinivasan, 1990; Gorova et al., 2019) mentioned a link between the company's success as represented by obtaining more profits and a

bigger market share, and the ability to offer a variety of products without high costs. Similarly, Suarez et al. (1996) noted that MF means a wide range of products at a particular moment. MF also helps companies offer the required products that meet customers' needs and preferences (Saenz et al., 2018).

Consequently, this would lead to customer satisfaction. In this regard, Cottrell and Nault (2004) found that introducing new products positively affects company performance because of increasing product diversity, while (Suarez et al., 1996; Zatonatska et al., 2019) mentioned that providing modern products has become essential for many industries, especially with rapid technological advances and changes in customers' preferences, and so. Therefore, introducing new products could give the company a significant competitive advantage. Regarding PDF, it refers to the company's ability to modify and improve the current products to meet the new consumption trends and efficiently shift production from products with low demand to new developed products with high demand that meet customers' needs. Flexibility could be seen from two basic sides. Firstly, as a capability, and secondly, as a powerful factor offering the manufacturing system the ability to react fast to market changes and acquire a competitive advantage (Hallgren and Olhager, 2009). In macro-environmental uncertainty, there is uncertainty in the organization's general environment, including political, regulatory, statutory, and economic conditions Jabnoun et al. (2018). De Toni and Tonchia (1998) and Jack and Raturi (2002) considered flexibility an absorber for uncertainty. Also, it is a kind of reaction to uncertain situations (Swamidass and Newell, 1987; Abramova et al., 2020).

Operational flexibility helps companies to decrease the economically negative consequences of the difference between demand and supply by enabling them to reallocate their capacity according to changing demand (Goyal and Netessine, 2011).

Methodology and research methods. This paper aims to investigate the relationship between operational flexibility and companies' performance. Besides, it considers environmental uncertainty to be a moderator in understanding the moderating effect of uncertainty on the relationship between operational flexibility and companies' performance.

Based on what has been discussed above, the main hypotheses could be formulated as follows:

H1: Operational flexibility positively affects the performance of pharmaceutical SMEs in Iran.

H2: Uncertainty moderates the relationship between operational flexibility and the performance of pharmaceutical SMEs in Iran.

This study is a quantitative and causal one. The aim is to investigate the link between operational flexibility and companies' performance by considering the moderating effect of environmental uncertainty on the link between the variables. That matches the explanations for causal or explanatory studies provided by Swamidass and Newell (1987) and Baarda et al. (2001).

This study is a survey study. For achieving the study objectives, data were collected by a questionnaire based on a five-point Likert scale; using survey studies is a good technique to get the maximum possible amount of data from many respondents (Baarda et al., 2001). Uncertainty measured based on Saunders et al. (2009). MF, VF and PDF based on (Fynes et al., 2004; Zhang and Doll, 2001). Financial and operational performance based on (Zhang and Doll, 2001; Zhang et al., 2003; Flynn et al., 2010), customer satisfaction based on (Fynes et al., 2004; Flynn et al., 2010; Narasimhan and Kim, 2002). The questionnaire forwarded to managers who work at medium and small-sized pharmaceutical companies in Iran. The people selected for the study were managers of specific departments (production manager, marketing manager, and sales manager). The total number of small and medium-sized pharmaceutical companies is 113, and 228 managers participated in the survey. They were different in age, qualification, and gender. Regarding the statistical analysis, the following techniques were used: descriptive analysis, linear regression analysis, and moderation analysis (Hayes, 2012). Time horizon, this study is a cross-sectional one, which means the study was carried out at a specific time (2019) and does not cover a time series.

Results. The correlation test was carried out with the Pearson correlation test to understand the correlation degree between the variables. Table 1 explains that the correlation between the variables is moderate, but all the correlation relations were significant. The correlations between the independent variables (PDF, VF, and MF) and dependent variable (performance) were significantly correlated.

Table 1. Correlations Results

Model 1	UN	MF	VF	PDF	Performance
UN	1				
MF	0.467**	1			
VF	0.533**	0.607**	1		
PDF	0.599**	0.675**	0.588**	1	
Performance	0.538**	0.545**	0.600**	0.643**	1

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

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

Sources: developed by the authors.

For testing the first main hypothesis and its sub-hypotheses, linear regression analysis was used to investigate the causal relationship between operational flexibility and companies' performance. According to Table 2, operational flexibility affects company performance positively, and operational flexibility explains 48.5% of performance variance.

Table 2. Regression results of different dimensions of flexibility – Total performance

Independent Variables	Dependent Variable	Performance
Model 2		
Constant	0.911 ***	
MF	0.080	(0.084)
VF	0.296***	(0.313)
PDF	0.377***	(0.402)
R	0.702	
Adjusted R ²	0.485 (48.5%)	

Levels of significance: *p < 0.1; **p < 0.05; ***p < 0.001

Sources: developed by the authors.

Depending on the summarized results in Table 2, the first main hypothesis on «operational flexibility positively affects SME pharmaceutical companies' performance in Iran» is accepted. Mix flexibility does not affect company performance. Thus, the sub-hypothesis 1a that «Mix flexibility positively affects SME pharmaceutical companies' performance in Iran» is rejected. Volume flexibility affects company performance positively, and its effect is equivalent to 31.3%. Therefore, the sub-hypothesis 1b that «Volume flexibility positively affects the performance of SMEs pharmaceutical companies in Iran» is accepted. Product development flexibility affects company performance positively, and it has the first greatest effect on company performance (40.2%). In turn, the sub-hypothesis 1c that «PDF positively affects thSME pharmaceutical companies' performance Based on the coefficient results, the regression equation could be formed as follows:

$$Y = 0.911 + 0.296 X_1 + 0.377 X_2, \quad (1)$$

where X_1 – VF, X_2 – PDF, Y – performance.

Based on the above-mentioned, Figure 1 summarizes the effect of different dimensions of operational flexibility on SME Iranian pharmaceutical companies' performance.

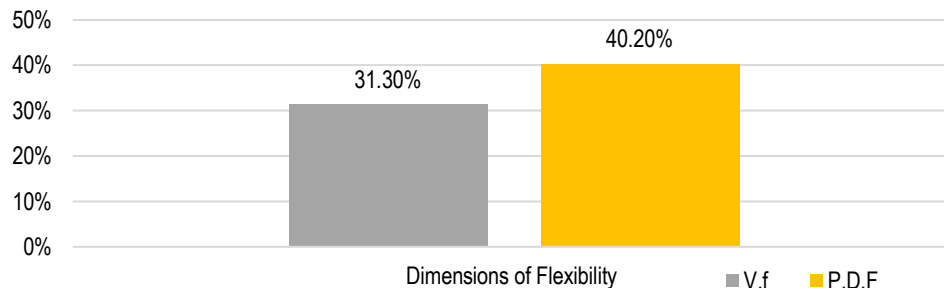


Figure 1. The effect of flexibility dimensions on companies' performance

Sources: developed by the authors.

For more details, Table 3 shows the regression analysis of different dimensions of operational flexibility – different dimensions of SME pharmaceutical companies' performance in Iran.

Table 3. Regression results of different dimensions of flexibility – different dimensions of performance

Independent Variables	Dependent Variable					
	FP	Performance	CS	Performance	OP	Performance
Constant	0.878*		0.786*		1.070***	
MF	0.218*	(0.147)	0.137	(0.118)	-0.116	(0.120)
VF	0.626***	(0.421)	0.198**	(0.169)	0.066	(0.068)
PDF	-0.041	(0.028)	0.434***	(0.374)	0.740**	(0.766)
R	0.505		0.584		0.730	
Adjusted R ²	0.245		0.332		0.527	

Sources: developed by the authors.

Table 3 shows that mix flexibility affects financial performance positively. But it does not affect customer satisfaction and operational performance as well. Volume flexibility affects both financial performance and customer satisfaction positively, but it does not affect operational performance. Product development flexibility does not affect financial performance. But it affects both customer satisfaction and operational performance positively. Based on the above-mentioned, the following (Figure 2) summarizes the effect of different dimensions of flexibility on the different dimensions of the performance of SME pharmaceutical companies in Iran.

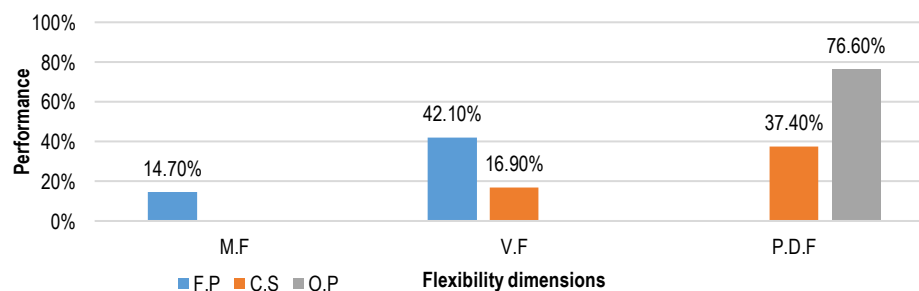


Figure 2. The effect of flexibility dimensions on the dimensions of companies' performance

Sources: developed by the authors.

According to Table 4, there is no effect of uncertainty as a moderator variable on the link between OF and companies' performance because all P values > 0.01. Moreover, the value of (0) is in the following ranges [-1.4827, 6.0034], [-0.7857, 1.158], [-1.2616, 0.7719], [-0.1407, 0.3788]. Thus, the second main hypothesis that «uncertainty moderates the relationship between operational flexibility and performance of SMEs Iranian pharmaceutical companies» is rejected.

Table 4. Moderated regression analysis (uncertainty as a criterion)

	β	R	R ²	T	P
Constant	2.2604 [-1.4827, 6.0034]			1.19	0.235
OF	0.1866 [-0.7857, 1.158]	0.7052	0.4974	0.3781	0.705
UN	-0.2448 [-1.2616, 0.7719]			-0.4754	0.635
OF * UN	0.1191 [-0.1407, 0.3788]			0.90310	0.03674

Sources: developed by the authors.

According to the analysis, OF affects the performance of Iranian SME pharmaceutical companies positively. But this result is not valid for all dimensions of operational flexibility. Both VF and PDF positively affect the target companies' performance, and the relationship between each one of them and performance is significant ($p < 0.01$). Despite the positive effect of MF on target companies' performance, this effect is not significant ($p > 0.1$). For more details on the impact of operational flexibility dimensions on performance dimensions, the results show that MF affects only financial performance positively but does not significantly affect customer satisfaction or operational performance. VF positively affects financial performance and customer satisfaction, whereas it does not significantly affect operational performance. PDF affects customer satisfaction and operational performance positively, whereas it does not significantly affect financial performance.

Conclusions. Based on moderation analysis, uncertainty does not moderate the link between operational flexibility and company performance, which means that the relationship between operational flexibility and company performance would not be affected or changed in uncertain situations. Furthermore, operational flexibility relates to the manufacturing process inside the company, which means it would be limited to the internal business environment, which is totally under company management control. Moreover, if the company applies strategic flexibility as a mechanism to deal with uncertainty, that would be enough. The main outcomes of the research could be summarized in a basic sentence: «when a company applies flexibility as an operational mechanism, this will lead to an enhancement of its performance» (Yu et al., 2015). Operational flexibility affects companies' performance positively, and the relationship is significant. However, environmental uncertainty does not affect this relationship. That means that operational flexibility, represented by MF, VF, and PDF, enhances company performance even in the absence of the effect of environmental uncertainty. The mentioned above is because operational flexibility with the considered dimensions is related directly to the production process, which occurs within the organization. Therefore, there is no effect on the external business environment. Moreover, strategic flexibility could create an umbrella for operational flexibility and a defensive wall against environmental uncertainty. In other words, when a company has strategic flexibility, it automatically follows that its operational activities would be going smoothly without problems.

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Управління ефективністю діяльності компаній: роль операційної гнучкості

Стаття узагальнює аргументи щодо мінімізації рівня невизначеності, спричиненої низкою непередбачуваних обставин у наслідок використання на операційному рівні показника гнучкості для підвищення ефективності діяльності компаній. Метою роботи є аналіз взаємозв'язку між оперативною гнучкістю та результатами діяльності компаній, враховуючи вплив невизначеності зовнішнього середовища. Автори відмітили, що проведене дослідження є кількісним. Вибір дослідження складається зі 113 малих та середніх підприємств фармацевтичного сектору Ірану. До опитування було залучено 228 менеджерів, які працюють на досліджуваних підприємствах. Методичним інструментарієм є дедуктивний метод з використанням синергетики для систематизації наукових напрацювань з досліджуваної проблематики та емпіричного доведення гіпотез дослідження. У статті сформуовано наступні гіпотези: 1) операційна гнучкість позитивно впливає на продуктивність фармацевтичного сектору Ірану (представленого малими та середніми підприємствами); 2) невизначеність визначає взаємозв'язок між операційною гнучкістю та ефективністю малих і середніх фармацевтичних підприємств Ірану. Розроблена авторами модель дозволила встановити взаємозв'язок між змінними за допомогою регресійного аналізу та аналізу модерації (модель Хейза). Результати емпіричного аналізу засвідчили, що показник «змішана гнучкість» практично не впливає на ефективність діяльності компаній, а показники «гнучкість за об'ємом випуску» та «гнучкість продукту до удосконалень» загалом позитивно впливають на результати діяльності компаній фармацевтичного сектору. При цьому показник «зовнішня невизначеність» не сприяє послабленню взаємозв'язку між показником «операційна гнучкість» та результатами діяльності підприємств фармацевтичного сектору Ірану. Результати проведеного дослідження можуть бути корисними у процесі планування діяльності малих та середніх підприємств для підвищення показників їх ефективності.

Ключові слова: гнучкість, малі та середні підприємства, невизначеність, ефективність, статистичний аналіз.