



Analysis of DarouPakhsh MFG Co. from the organizational life cycle perspective during 2009-2016

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ABSTRACT

Background: Organizational life cycle (OLC) model is an approach for analyzing the economic features of organizations. Determining a company OLC is the first step in identifying its weaknesses and can offer the right solutions to address them. In this study, the OLC stage of DarouPakhsh MFG Co. (DPMC) was investigated. The results of this study help the company develop more appropriate programs to achieve organizational goal.

Methods: The present study is a descriptive-analytical study from 2009 to 2016, during which the OLC of DarouPakhsh MFG Co was studied. The four variables, age, annual sales growth, capital expenditures, and dividend payout ratio, were calculated, and the OLC score - which shows the OLC stage - was constructed using the Anthony-Ramesh method.

Results: According to the results, DPMC was in the maturity phase between 2009 to 2016, except for 2014, which was in the decline stage. The reason for the reduced OLC index was mainly lowering sales growth and fixed assets.

Conclusion: DPMC can set appropriate implementations, such as lowering the DPR and current cost or increasing fixed assets to improve its financial performance. Growing fixed assets lead to new technology and product that will enhance firms' production capacity and profitability. Also, more marketing efforts can increase its sales growth and, subsequently, the OLC index.

Keywords: Pharmaceutical Company, DarouPakhsh MFG Co., OLC Index, Anthony-Ramesh Method.



Introduction

Organizations are born like any living creature, grow, reach maturity, and ultimately suffer from aging and burnout. One of the applicable models for analyzing organizations is determining the organizational life cycle (OLC). OLC has four main stages that include introduction, growth, maturity, and decline [1]. According to this model, each product, service, industry, or business has a lifetime period. This means that the organization is born and introduced to the market, grows, and then the maturity stage has come, and ultimately it faces the aging and decline stage. Various studies have no consensus about the stages of organizational development, but it is clear that the organizations have certain features in each of the OLC stages [2]. Identifying an organization OLC stage is the first step towards diagnosing its diseases and finding a suitable solution for its treatment [3]. Below are some of the characteristics of the OLC stages of an organization:

Introduction stage: Organizational motion, high creativity, attention to needs of the market, the procurement of organizational strategies and systems, increase in executive power, high growth ratio, low market share, high liquidity, low production and profitability, high costs, small payment profit [4].

Growth stage: Promotion of ideas, rules, and regulations, the possibility of changing goals, high growth rate, growth of market share, decrease in liquidity, profitability growth, increase in production and services [5].

Maturity stage: The institutionalization of organizational structure, maximum customers satisfaction, increasing leadership role, the birth of new goals and missions, growth of market share, decrease in liquidity, increase in profitability, production and services, decrease in costs

Decline stage: Lack of innovation and creativity, start of bureaucracy, increase in organizational contradictions, decrease in the organization control, growth ratio, and market share, increase in liquidity need, decreased profitability, and production, increased costs, political games, and power struggles, risk avoidance [6].

Using the organization life cycle model is one of the approaches to evaluate the performance of companies [7]. After identifying the OLC stage, proper strategies should be planned so that the organization always remains in its growth and maturity stage. In case of incorrect guidance

and planning, the decline stage appear and will eventually lead to the destruction of the organization [1].

Health-related industries such as pharmaceuticals are considered one of the most important economic sectors of any country due to their direct impact on human life and public health [8–10]. The pharmaceutical industry has a significant impact on the economy of countries in other aspects, such as its essential role in the stock market, profitability, and GDP after the oil and gas industry [9]. The growing trend of the pharmaceutical industry in Iran is more than in other third world countries [11]; however, the lack of an evaluation system in any economic sector means a lack of connection with the external organizational environment, and its consequences the death of the companies. Although corporate executives may not feel this phenomenon due to its sudden occurrence, studies in this field have shown that the improvement and development of a company would be impossible without control and evaluation systems [7]. Therefore, a realistic and comprehensive evaluation of this industry will identify its weaknesses and strengths and, secondly, direct the available resources towards optimizing the existing conditions [12].

For the first time in Iran, this study examines the OLC stage of DarouPakhsh Pharmaceutical Company (DPMC) - one of the greatest pharmaceutical companies in Iran- through 2009-2016 using the Anthony-Ramesh method [13]. Determining the OLC stage will help the company consider different strategies to have a continuous presence in the market and develop appropriate plans to achieve organizational goals.

Literature review

The concept of the organizational life cycle has a long history and it is one of the most basic management concepts. Boulding first introduced the concept of OLC in 1950 and stated that organizations, in general, have three stages of birth, youth, and maturity [7]. Lippitt and Schmitdt in 1967 extended the concept proposed by Boulding and suggested that the development of companies occurs during four stages of development: birth, youth, stability, and maturity [14]. In 1972, Greiner proposed that organizations evolve through five consecutive stages, each of which follows a transition phase or evolution that results from major organizational problems. Only by solving the inherent problems in each stage of development one company can successfully

enter the next stage [15]. One of the most comprehensive models for the organizational life cycle was introduced by Adizes in 1979. According to Adizes theory, the life cycle of an organization is divided into ten stages, and the OLC curve of a healthy organization has a normal distribution. According to Adizes, as the companies move towards aging, the flexibility decreases, and they can't react to environmental changes as in the past [1].

After the evolution of the OLC theory, more researchers examined the characteristics of companies in each stage in order to identify the OLC stage for different companies:

In 1992, Anthony and Ramesh examined the relationship between financial performance metrics and stock value based on organizational life cycle theory. This study investigates the stock market's response to the two variables of sales growth and investment costs at each stage of the organizational life cycle, using four variables of annual growth, capital expenditures, dividend payout ratio, and the age of the organization. They determined the position of organizations at each stage of OLC, and then, using a regression method, they determined the factors related to market value. This study showed that during the life cycle of organizations, the rate of sales growth and investment costs decrease uniformly [13]. In 2001, Oliver examined the relationship between organizational life cycle and strategic alliances in 554 biotech pharmaceutical companies over 15 years. In this study, which was performed by regression method, a strategic alliance was considered a dependent variable in relation to different stages of OLC. The results of this study showed that the lack of strategic alliance would lead to decline stage of OLC and organizational death [16]. In 2006, Aharoni et al. compared the explanatory power of cash flow-based criteria and accrual-based criteria in explaining the company's value at different stages of the company's OLC. This study investigated the relationship between different stages of OLC and financial variables using a regression method based on the Anthony-Ramesh method. The results indicated that criteria based on cash flows in the growth stage are more explanatory power than in other stages [17]. In 2012, Stepanyan examined the company's life cycle and the type of dividend payment. In this review study, the researcher has tried to create a broader perspective on financial issues at different organizational life cycle stages by examining past literature. The study results showed that the shares repurchase in the rapid growth stage is very likely and is a sign of the company's quality for

investors. Also, this study showed that payment of cash dividends to shareholders increases in the maturity stage of OLC [18]. In 2016, Ebadi examined the effects of the organizational life cycle on conservative accounting approaches in 146 companies listed on the stock exchange during the years 2008-2014. In this study, based on the Anthony-Ramesh method, four variables of annual growth, capital expenditures, dividend paid ratio, and organization age are defined for each stage of OLC. The results showed that companies at the beginning of their growth period adopt more conservative policies to increase their hidden reserves. Therefore, in the first years of growth, companies have made less profit [5]. In 2019, Ataabadi and Ahmadi examined the impact of restructuring the financial structure by emphasizing the life cycle of 148 countries listed on the stock exchange using the Anthony-Ramesh method. The results showed that when the deviation of the capital structure increases, the company's value decreases. At each stage of the organizational life cycle, policies and strategies related to the organizational position can be adopted to improve the financial situation reduce risk [19]. All of these studies tried to identify the position of organizations in their life cycle by expressing specific characteristics in each stage of OLC to improve their economic performance.

Among the studies that have examined the performance of pharmaceutical companies in Iran, we can mention the study of Mohammadi (2009), Kaidpour (2013), Mohammadi (2015), Abbasi (2015), and Mansouri (2015). In all these studies, researchers tried to rank companies based on their financial performance [20].

The Anthony-Ramesh method is one of the methods that has been used repeatedly in previous studies to identify organizational positions [5, 19, 21]. In the current study, the Anthony-Ramesh method has been used to analyze the life cycle of DPMC due to its wide acceptance in various texts and better results than other methods [22].

Method

Data collection

This study is an analytical, descriptive, and cross-sectional study during 2009-2016. In this study, we used the Anthony-Ramesh method (3), to detect organizational life cycle situations of DPMC. The financial information about the company was obtained from the financial statements that are issued by DPMC annually in Codal website [23].



Variables

Based on the Anthony-Ramesh method, four variables of age, annual sales growth, capital expenditures, and dividend payout ratio were calculated to construct the OLC index and show the OLC stage of the company [5].

1) Annual sales growth (SG)

This variable shows the increase in sales compared to the previous year [24]. According to the Anthony-Ramesh model, this variable is directly related to the organizational life cycle index, and the higher value indicates the beginning of the life cycle [5].

$$SGt1 = 1 - (SG t1 - SG t0) \times 100$$

2) Capital expenditures (CE)

This variable represents the cost spent on the purchase of productive and fixed assets to generate profit in the future. This variable is also higher in companies in the early stages of their life cycle and vice versa [5].

$$CEt1 = [(\text{fixed assets } t1 - \text{fixed assets } t0) / \text{market value } t1] \times 100$$

3) Dividend payout ratio (DPR)

This variable is the fraction of dividend per share (DPS) to earnings per share (EPS). According to the OLC model, younger companies distribute lower dividends among members, and therefore the ratio is inversely related to the organizational life cycle [5].

$$DPR = (DPS/EPS) \times 100$$

4) Organization age

This variable indicates the age of the company since its establishment. It is clear that the longer a company lives, the more likely it enters the decline phase [5].

Data analysis

According to life cycle theory, each stage of an organizational life cycle is associated with specific financial characteristics. Companies, for example, show more sales growth in the first phase of the organizational life cycle. These companies invest heavily in equipment and land while having lower dividends payout ratios. A summary of the characteristics of companies at different stages of the organizational life cycle can be seen in Table 1.

For constructing the OLC index, first, the value of each variable (annual growth, capital expenditures, dividend ratio paid, and the organization age) was measured in each firm-year for DarouPakhsh pharmaceutical company. Then, to compare DarouPakhsh OLC indicators and score them, each of the mentioned variables was calculated for 18 pharmaceutical companies listed on the Tehran

Stock Exchange. The list of these companies is as follows:

- 1) Alborz darou Pharmaceutical Co.
- 2) Iran darou Pharmaceutical Co.
- 3) Pars darou Pharmaceutical Co.
- 4) Sina darou Pharmaceutical Co.
- 5) Osveh Pharmaceutical Co.
- 6) Aburaihan Pharmaceutical Co.
- 7) Kimidarou Pharmaceutical Co.
- 8) Razak Pharmaceutical Co.
- 9) Kowsar Pharmaceutical Co.
- 10) Loghman Pharmaceutical Co.
- 11) Zahravi Pharmaceutical Co.
- 12) Jaber Ebne Hayyan Pharmaceutical Co.
- 13) Rouz Darou Pharmaceuticals Co.
- 14) Exir Pharmaceutical Co.
- 15) Dr. Abidi Pharmaceutical Co.
- 16) Amin Pharmaceutical Co.
- 17) Farabi Pharmaceutical Co.
- 18) Sobhan Pharmaceutical Co.

In the next step, the box diagram of each variable was drawn using SPSS software so that the outlier data were detected and its effect in determining the range of variables was omitted. Then, the range of variables for all 19 companies was calculated to compare the DPMC variables with others. The range was divided into five categories, and the variables received a number between 1-5, depending on which category they belonged to. For example a company with a low annual sales growth (decline stage candidate) receives a score of 1 for the annual sales growth variable, and a company with a low dividend payout ratio (growth stage candidate) receives a score of 5 [5].

More details are shown in Table 2. In the last step, the sum of the scores of each variable was used for constructing the OLC index.

The sum of scores in Table 2 shows the OLC score for each firm-year, and the stage of OLC can be determined based on each score:

The total score of the growth stage is in the range of 16-20, the total score of maturity stage is in the range of 9-15, and the total score of decline stage is in the range of 4-8 [5, 18].

Results & Discussion

The four mentioned variables were calculated based on the mentioned method for 19 pharmaceutical companies listed on the Tehran Stock Exchange. Some of the statistical characteristics based on the accumulative information of the firms during 2009-2016 are presented in Table 3. In this study, the age of companies was considered from the year of their

establishment to 2016. A summary of this information is shown in Table 4.

Based on Table 4, the company has been in the maturity stage during 2009-2016, except for 2014. In 2014, the company was in the decline stage due to dropping sales growth and capital expenditures.

One point about the Anthony-Ramesh method is that the age variable has an effect equal to other variables. Although it can indicate the depreciation of assets and equipment, it seems necessary to reduce this variable effect in the model because age does not reflect the company's performance. However, each year due to equipment depreciation, the company book value is reduced by about 10% [25] but age alone cannot cause the organization aging and should have a fewer effect than the other three variables. The old age of the pharmaceutical companies in Iran and the lack of new investment is a significant obstacle to upgrading facilities which can be seen in DPMC too. The major shareholders of pharmaceutical companies, primarily semi-governmental organizations, are not interested in making such investments. However, it seems that any increase in investment and reconstruction will accompany production standards and drugs quality and increase the ability to export, especially to regional countries, and increase sales growth [26, 27]. Another reason for declining the OLC index of DPMC is decrease in the sales growth in 2014. It seems that the company has not been able to maintain its sales during these years.

The highest score among the indicators studied in this research was related to the dividend payout ratio. A critical point about DPR is the inverse relation of this score with OLC. As mentioned in the study method section, the higher the value of DPR, the lower its score and vice versa. Because in growing pharmaceutical companies, DPR is lower than in mature companies. In younger companies, the DPR rate is about 10-50%, and in mature companies, it is 50-100% [28]. As can be seen in Table 4, the average DPR has been above 70% during the study period, which is another evidence of the maturity of the company. DPR is important in three aspects: First, with the payment of dividends, the financial ability of companies in future investments decreases, and the need to attract capital from outside the company increases [28]. On the other hand, dividend payment reduces free cash flows and the possibility of over-investment by managers, and also reduces the risk of lower stock prices in the market, and keeps investors satisfied

[29]. Therefore, creating a balance between DPR and investment in equipment and technology is one of the critical factors that can improve the organizational life cycle.

Conclusion

This study is the first attempt to analyze DarouPakhsh Pharmaceutical Company as one of the largest pharmaceutical firms listed on the Tehran Stock Exchange from the organizational life cycle perspective. In this study, 8-year financial indicators of the company were extracted, and the OLC stage was determined.

DPMC can set an appropriate implementation, such as lowering the DPR and current costs and increasing fixed assets to improve its financial performance. Also, it can increase sales growth using increased marketing activities and product differentiation.

Ethical Considerations

Compliance with ethical guidelines

This study was approved by the ethical committee of the Tehran University of Medical Sciences (TUMS). All the participants accepted enrollment in the study orally and all of the data that were gathered was considered confidential.

Funding

This study has no funds.

Authors' contributions

AM conceptualized the study, designed, performed the data analysis, statistical interpretation, and drafted the paper. MM supervised the project and the critical revision of the article. RH contributed to the acquisition of data. All authors read and approved the final manuscript..

Conflict of interest

The authors declared no conflict of interest.



Tables

Table1. Anthony-Ramesh method descriptors at each stage of the organizational life cycle

Age	Sales growth	Capital expenditure	Dividend payout ratio	OLC stage
Young	High	High	Low	Growth
Mature	Medium	Medium	Medium	Maturity
Old	Low	Low	High	Decline

Table2. Five categories (Quintuples) of the Anthony-Ramesh model

Quintuples	Age	Sales growth	Capital expenditure	Dividend payout ratio
Category 1	5	1	1	5
Category 2	4	2	2	4
Category 3	3	3	3	3
Category 4	2	4	4	2
Category 5	1	5	5	1

Table3. Statistical characteristics of each variable based on the accumulative information of 19 pharmaceutical firms

Year	Age			Sales growth			Capital expenditure			DPR		
	Max	Min	Range	Max	Min	Range	Max	Min	Range	Max	Min	Range
2009	63	7	56	105.77	-	118.05	28.43	-	38.31	148.18	12.82	135.36
2010	64	8	56	32.77	-	63.08	13.25	-	15.74	93.56	9.43	84.12
2011	65	9	56	45.13	-	78.04	7.04	-	8.82	125.62	20	105.62
2012	66	10	56	84.79	-	104.14	15.71	-	17.68	128.08	20.04	108.03
2013	67	11	56	114.80	17.04	97.75	20.83	-	22.01	89.45	9.98	79.46
2014	68	12	56	52.38	-	72.53	23.79	-	25.06	107.01	16.39	90.62
2015	69	13	56	48.37	-7.89	58.26	8.00	-	8.31	99.33	10.26	89.07
2016	70	14	56	43.54	1.41	42.13	9.86	-	14.98	94.26	11.90	82.36

Table4. OLC indicators amount of DarouPakhsh Pharmaceutical Co. and related score

Year	2009	2010	2011	2012	2013	2014	2015	2016
SG%	17.61	8.58	14.89	36.43	80.22	-8.07	22.4	7.75
SG score	2	4	4	3	4	1	3	1
CE%	1.53	2.23	7.047	15.72	5.09	3.49	8.00	7.18
CE score	2	2	5	5	2	1	5	5
DPR%	84.54	84.27	83.68	75.02	71.94	88.32	99.34	83.66
DPR score	2	2	5	5	2	2	5	5
Age	46	47	48	49	50	51	52	53
Age score	2	2	2	2	2	2	2	2
OLC index	9	13	15	13	12	8	15	13
Stage	Maturity	Maturity	Maturity	Maturity	Maturity	Decline	Maturity	Maturity

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