

ANALYSIS OF STOCK EXCHANGE OPERATING COSTS ON THE EXAMPLE OF WARSAW STOCK EXCHANGE

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Purpose: The purpose of this paper was to identify and analyze the costs of the stock exchange on the example of the Warsaw Stock Exchange. As a hypothesis, it was assumed that the electronization of stock exchange trading has affected the cost structure, under which the role of personnel costs and IT costs increased.

Design/methodology/approach: The method of analyzing indicators identifying the cost structure was used to conduct the research. For this purpose, the financial statements of the Warsaw Stock Exchange Group (GPW) for the years 2007-2018 were used.

Findings: The empirical research conducted shows that personnel costs and the costs of external services had the largest share in the cost structure in the covered period. In the category of external services, the most important were the costs of IT services – IT trading support. Interestingly, however, maintenance costs of office buildings and equipment were at a relatively significantly lower level compared to personnel costs and IT costs.

Research limitations/implications: The analysis of financial data on stock exchanges is limited by the presentation of financial data. This is due to the fact that the processes of transformation into commercial businesses are a relatively new phenomenon.

Originality/value: The originality of the article is associated with the analysis of financial data in relation to the business entity which is the stock exchange (on the example of Warsaw Stock of Exchange).

Keywords: stock exchange, costs, financial statement analysis.

Category of the paper: research paper.

1. Introduction

In the traditional approach, the stock exchange is defined as “any organization, association, or group of persons, whether incorporated or unincorporated, which constitutes a market place or facilities for bringing together purchasers and sellers of securities or for performing, with respect to securities, other functions commonly performed by a stock exchange, such as

settlement” (Securities Exchange Act, Sec 3.1, 1934). This definition approaches stock exchange as a special type of market where securities are traded.

The changes that occurred in the late 20th and early 21st century changed the nature of the operation of stock exchanges. New IT and telecommunications solutions have changed the investment rules. In most cases, electronic trading was introduced onto the trading floors, which replaced the existing open outcry system, involving the conclusion of transactions between physically participating brokers (Stoll, 2008, pp. 15-27). Thus, presence on the trading floor ceased to be a necessary requirement for the course of a session. Stock exchange buildings are turning into large server rooms. Thanks to IT systems, transactions are concluded on the basis of incoming orders, according to a strictly defined algorithm, and traders on the trading floor are replaced by powerful computers programmed by scientists and economists (Różyński, 2010).

As a result of the elimination of the intermediary function of brokers, a process of moving away from the membership (mutual) structure towards shareholding ownership structure, called the demutualization process, occurred (Chesini, 2007, pp. 140-160; Steil, 2002, p. 6). State-owned stock exchanges were privatized. The processes of organizational transformation, in turn, triggered further initiatives of the stock exchange – Initial Public Offering (IPO) (Rydzewska, 2016, p. 55).

These transformations were reflected in the operating costs of stock exchange. The virtual nature of the stock exchange has eliminated the costs associated with the operation of a traditional stock exchange. There is no longer a need to maintain a traditional trading floor and bear the costs associated with its functioning, such as rent or energy (Boisvert, Gaa, pp. 15-16). On the other hand, computerization of stock exchange trading generated personnel costs related to servicing the electronic trading market and the costs of IT services.

The purpose of this paper was to identify and analyze the costs of the stock exchange on the example of the Warsaw Stock Exchange. As a hypothesis, it was assumed that the electronization of stock exchange trading has affected the cost structure, under which the role of personnel costs and IT costs increased. The method of analyzing indicators identifying the cost structure was used to conduct the research, with particular emphasis on personnel costs and the costs of external services. For this purpose, the financial statements of the Warsaw Stock Exchange (GPW) Group for the years 2007-2018 were used.

2. The operation of a stock exchange

Contemporary stock exchanges, after the implementation of demutualization processes, take the form of commercial business entities that offer their services. The group of stakeholders, who are interested in the financial result generated on the stock exchange,

are no longer members, but owners – usually shareholders (Jonek-Kowalska, Zieliński, 2017, pp. 1294-1304).

At present, stock exchanges are complex conglomerates that operate by providing services (Gorczyńska, 2012, pp. 33-35). According to Figure 1, which shows the services chain of a stock exchange, they cover four basic areas (Prospectus of WSE, 2010): issuer services, trading in financial assets on the secondary market, dissemination of information on listing and IT services.

The first link is related to issuer services, i.e. admission and issue of securities on the primary market. The clients, to whom the services are addressed, are the issuers of financial instruments approved for issue.

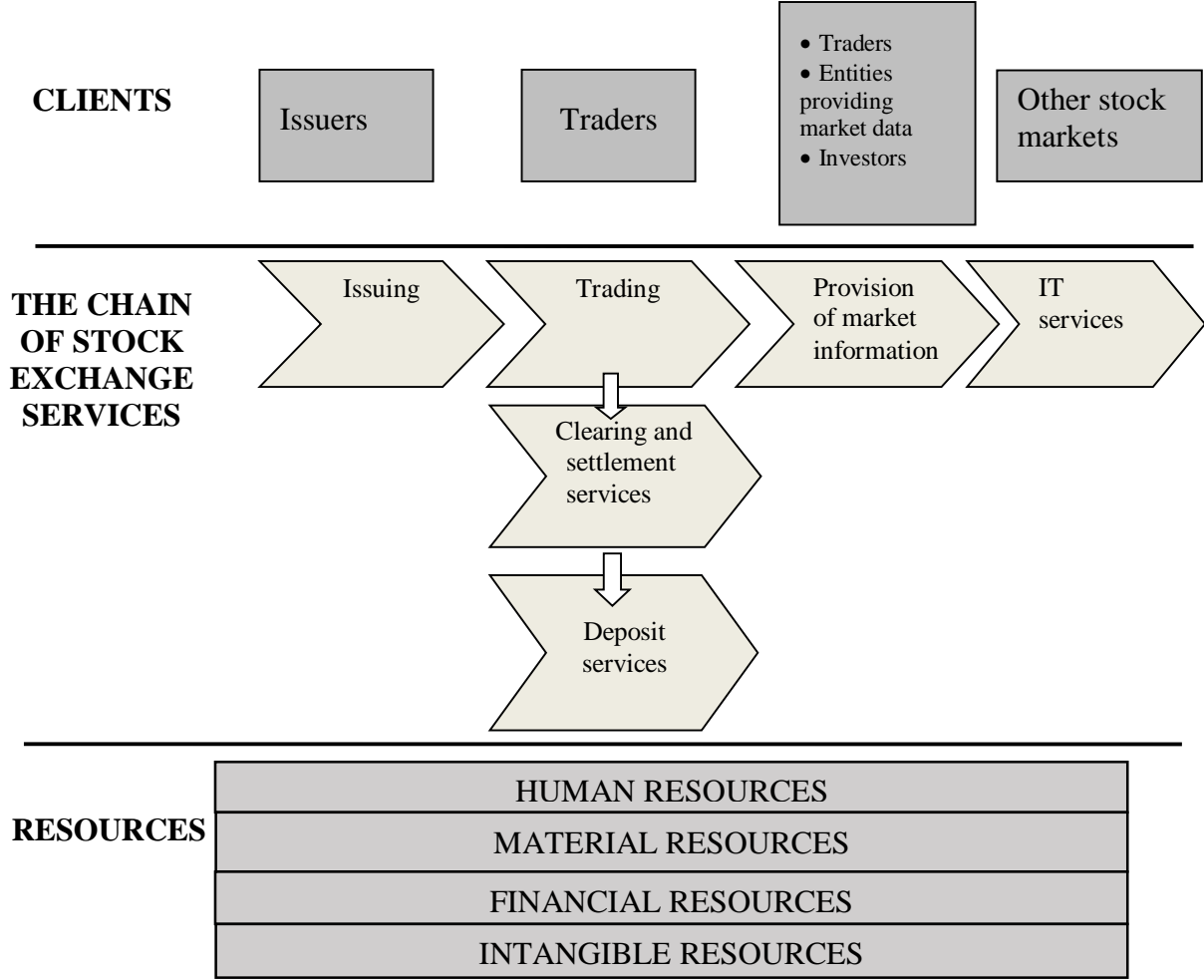


Figure 1. Stock exchange services chain.

The second element of the chain is the link related to trading financial assets on the secondary market. Trading includes both spot instruments (shares, bonds) and derivatives. Currently, many stock exchanges provide clearing and settlement services for transactions carried out on the secondary market and/or securities depository services as part of this link. The clients using the services of such stock exchanges are entities participating in trade,

i.e. institutional investors – banks, investment, and pension funds etc., as well as individual investors – natural persons (Kokkoris, Olivares-Caminal, 2008, pp. 837-869).

The third link of the chain are services related to the dissemination of information on listings. The recipients of these services are professional distributors of economic information (e.g. news agencies, investment companies, online portals), as well as recipients of processed and analyzed data – stock investors (Di Noia, 1999, pp. 21-22).

The last link in the chain are services related to the sale and provision of IT services. The operation of modern stock exchanges is based on electronic trading, for which computer listing systems form the basis of their efficiency. Stock markets, especially smaller ones, which are unable to create their own competitive software, buy it from other, usually leading, world stock exchanges¹.

Specific resources are allocated to the provision of services within each link: human, material, financial and intangible. People participate in the operation of both the individual links of the chain and the entire stock market. These include qualified financiers, economists, IT specialists responsible for the efficiency and security of trading in financial instruments, for admitting the assets of entities requesting issues and listing on a selected segment of the stock market etc. The second category is material resources. The stock exchange, like any enterprise, uses specific buildings, means of transport, computer equipment and other tangible assets to carry out its operations. Funds are the third category of resources. The activity of a business entity, especially a financial institution, is associated with the generation of cash, receivables, and investments in various types of financial assets. The last group of resources are intangible resources. Stock exchanges, which are nowadays platforms trading in dematerialized financial assets, use advanced IT technologies, such as transactional systems, stock exchange networks for document circulation systems etc. to implement their activities. They usually have the form of licenses, patents or other intellectual property rights.

Resources are necessary for the implementation of stock exchange activities related to the provision of services (Szwajca, 2013, pp. 165-171). At the same time, they are a source of costs.

3. Stock exchange operating costs – research methodology

According to Polish legislation (Accounting Act, Article 3.1 section 31), costs mean a probable decrease in economic benefits in the reporting period by a reliably determined value, in the form of a decrease in the value of assets or an increase in liabilities and provisions that

¹ The Warsaw Stock Exchange has been operating on the basis of the UTP system since 15 April 2013, which had been purchased from NYSE Technologies. The same trading platform is used by the stock exchanges: NYSE Euronext based in New York, Paris, Lisbon, Amsterdam and Brussels, as well as many other stock markets. <http://www.gpw.pl/utp>.

will lead to a decrease in company capital or increase its deficiency in other ways than the withdrawal of funds by shareholders or owners. The Warsaw Stock Exchange, as a business entity based in Poland, applies the provisions of the said act. Since 2010, it has been issuing its own securities.

The operating costs of a stock exchange, as in classic enterprises, can be classified by type of activity (Michalak, 2013, pp. 11-25). Therefore, the costs of basic operating activities, costs of other operating activities and financial costs are identified (Gmytrasiewicz, Karmańska, 2010, pp. 500-504). The costs of basic operating activities include costs that relate to the main activity, i.e. activity for which the stock exchange (as an enterprise) has been established, which is repetitive and not incidental in nature. The Warsaw Stock Exchange keeps a record of costs by type (Consolidated financial statements of the Warsaw Stock Exchange, 2018). In particular, these include:

- personnel costs (salaries and other employee benefits) – related to the employment of people to carry out the services provided by the stock exchange,
- the costs of depreciation (computer hardware, software, other devices) and consumption of tangible resources in connection with the operation of the exchange,
- the costs of external services (e.g. IT companies), as well as rents, energy bills, telecommunication services related to the operation of the trading floor etc.,
- taxes and fees, including mandatory fees charged by the Polish Financial Supervision Authority (PFSA),
- other operating costs, e.g. research and development, as well as marketing costs, incurred in connection with the development of the stock exchange, as well as the promotion and advertising of its activities.

Other operating costs include costs indirectly related to operating activities. They include, among others, the value of fixed assets sold, as well as intangible assets, write-downs on non-financial assets, write-offs of uncollectible receivables, penalties and fines.

Financial costs are the costs associated with financial operations. They include, among others, the value of financial assets sold, write-downs on short-term financial assets, interest, discount on bills of exchange, negative exchange rate differences. WSE as the main source of financial costs indicates the costs associated with servicing the debt associated with the issue of bonds (Consolidated financial statements of the Warsaw Stock Exchange, 2018).

In order to analyze the operating costs of the Warsaw Stock Exchange, the author of this paper uses a method of analyzing indicators identifying the cost structure. This indicator is presented in Formula 1.

$$CSI = \frac{\text{individual type of cost}}{\text{total costs}} * 100\% \quad (1)$$

This indicator shows the share of individual types of costs in total costs. An increase in the ratio means an increase in the importance of a given type of cost in the business entity's operations. Time series analysis of cost structure indicators enables the identification of dynamic trends of changes in the share of a particular type of costs.

4. Analysis of operating costs of the Warsaw Stock Exchange

To analyze WSE's operating costs, the consolidated financial statements of the Warsaw Stock Exchange (GPW) Group for the years 2007-2018, published on the stock exchange website (<https://www.gpw.pl/relacje-inwestorskie>), were used.

Looking at the cost structure presented in Table 1, one can see that the basic operating costs constituted the dominant part. They accounted for over 90% of total costs. The exception was 2012 when this share fell to 84%.

Table 1.

WSE operating cost structure indicators (CSI) for the years 2007-2018

		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
I	Basic operating costs, incl.:	99%	95%	96%	97%	98%	84%	91%	91%	92%	83%	92%	94%
1	Depreciation	15%	10%	12%	12%	11%	9%	14%	14%	14%	14%	16%	17%
2	Personnel costs	27%	23%	27%	26%	29%	27%	29%	28%	30%	27%	28%	30%
3	Other personnel costs	8%	7%	7%	6%	9%	7%	7%	7%	6%	6%	7%	7%
4	Rent and other service charges	6%	5%	5%	5%	5%	6%	6%	5%	5%	5%	5%	5%
5	Taxes and fees	3%	9%	13%	12%	12%	11%	11%	11%	13%	6%	4%	7%
5a	incl.: PFSA fees	2%	8%	12%	11%	11%	10%	10%	11%	12%	5%	3%	7%
6	External services	31%	31%	26%	31%	27%	19%	20%	21%	21%	21%	30%	24%
7	Other costs	10%	11%	7%	5%	6%	5%	5%	4%	3%	3%	3%	3%
II	Other operating costs	1%	5%	3%	2%	1%	6%	1%	3%	1%	11%	2%	1%
III	Financial costs	0%	0%	0%	1%	0%	10%	7%	6%	6%	7%	6%	5%

Analyzing particular types of operating costs, one can see that the largest share was constituted by personnel costs (in the table: personnel costs and other personnel costs). They amounted to over 30% of all costs, and in 2018 they increased to 37%. External services had a significant share of the costs in the covered period. Their share ranged between 31 and 24%. Depreciation costs were at the level of 15-10%, and the cost of rent and other service charges – at 5-6%. Both these types of costs did not show clear trends, either downward or upward. Analyzing the cost of “Taxes and fees”, the majority of payments were fees charged by the PFSA. They resulted from the costs of supervision over the capital market, carried out by the Polish Financial Supervision Authority (PFSA) (www.knf.gov.pl). The last type of basic operating costs was an item “Other costs”. It showed a decreasing tendency – in 2007

it accounted for 10% of total costs, and in 2018 – only 3%. It includes, among others, representation and advertising costs.

Other operating costs, i.e. those indirectly related to operating activities, fluctuated around the level of a few percent, and only in 2016, they increased to 11%. The increase in these costs was probably caused by changes in the authorities and in the supervisory board of the WSE.

There were no financial costs in the first three years of the covered period. Their significant value appeared in 2012 when they amounted to 10%. In subsequent years, their share in the cost structure was 7-5%. The increase in financial costs was related to the issue of corporate bonds by the WSE. In 2012, the WSE issued its own type A and B bonds. In 2015, another type of series C bonds was issued, and A and B bonds were partially redeemed. In 2016, a resolution was adopted regarding the issue of series D and E bonds (www.gpw.pl/oferty-obligacji). As an issuer, the WSE pays interest on bonds, which are calculated using the effective interest rate.

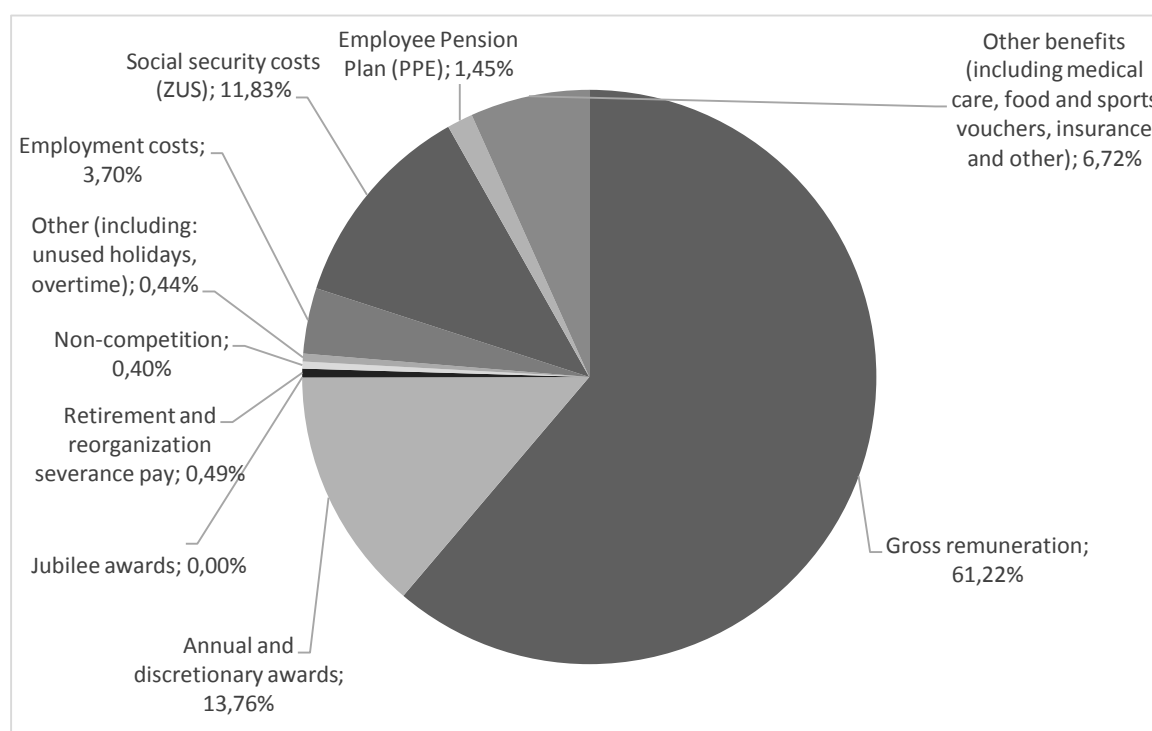


Figure 2. WSE's personnel cost structure (2018).

A more detailed analysis of the costs, which have the largest share in the cost structure of the WSE, shows that personnel costs are in the lead. Figure 2 presents their structure. Thus, within the costs in question, the dominant part (61.22%) constituted gross remuneration. Other components are annual and discretionary awards (13.76%), social security contributions (11.83%), other benefits, e.g. medical care, food and sports vouchers (6.72%) and employment costs (3.7%). Other components of personnel costs, such as contributions to the employee pension program, retirement and reorganization severance pay, jubilee awards, non-competition and other (e.g. unused holidays, overtime) had a scanty share in the structure. It fluctuated between 1.45% and 0.4%. The high share of personnel costs in total costs,

and, most of all, the share of salaries and derivatives, can be associated with the fact that people are the most important resources in the WSE's operating chain.

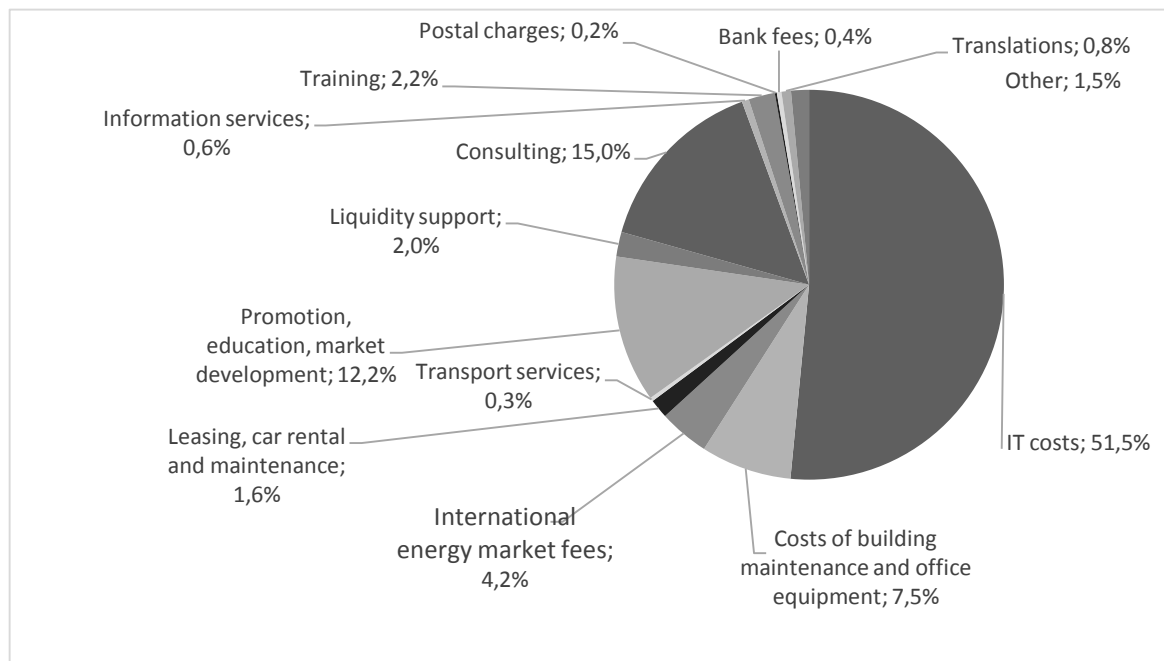


Figure 3. WSE's external services cost structure (2018).

A detailed analysis of the cost structure of external services, presented in Figure 3, shows that the largest part is constituted by IT services (51.5%). These costs were related to the maintenance of IT infrastructure of transaction systems intended for handling trading in financial instruments on the financial market. Other services, listed in descending order, according to their share in the cost structure, include: consulting (15%) and promotion, education, market development (12%). They also include expenses related to the functioning of the capital market. The costs of building maintenance and office equipment accounted for 7.5% of the cost of external services. They were relatively low, compared to personnel costs and IT costs. This is due to the fact that the competitiveness of modern stock exchanges is determined by people and technological support. International energy market fees accounted for 4.2% of the costs of external services. Other costs, including the costs of training, liquidity support, leasing, car rental and maintenance, translations, bank fees, postal charges, transport services, have a small share in the structure of the costs discussed. They range from 2.2% to 0.2%.

5. Conclusions

The purpose of this paper was the analysis of stock exchange operating costs on the example of the Warsaw Stock Exchange. As a hypothesis, it was assumed that the electrification of stock exchange trading has affected the cost structure, under which the role of personnel costs and IT costs increased.

The empirical research conducted shows that the dominant part of costs in the covered period were the basic operating costs (over 90%). With regard to specific types, personnel costs had the largest share. They amounted to over 30% of all costs, and in 2018 they increased to 37%. A detailed analysis of personnel costs has shown that payroll costs were the most significant. Gross remuneration and personal salaries constituted 65% of personnel costs. The next group were the costs of external services. In the structure of all costs, their share in the years 2007-2018 ranged from 31 to 24%. In this group, the most important were the costs of IT services supporting trading (51.5%). It is interesting, however, that maintenance costs of office buildings and equipment accounted for 7.5% of the costs of external services. They were at a relatively significantly lower level compared to personnel costs and IT costs.

The presented structure of WSE's operating costs reflects the current nature of stock exchanges. Modern stock exchanges are trading platforms for dematerialized financial instruments, where people, skills, expertise, as well as technical IT support are crucial for the functioning and development of organized stock exchange.

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