

Developing a purchasing strategy for high chromium grinding media. Case company: KGHM Polska Miedź S.A, Ore Enrichment Plants.

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<p>Title of report Developing a purchasing strategy for high chromium grinding media. Case company: KGHM Polska Miedź S.A, Ore Enrichment Plants.</p>	<p>Number of report pages and attachment pages 53+5</p>
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<p>This thesis was conducted according to the needs of KGHM Polska Miedź S.A. The company was interested in improving the purchasing strategy of high chromium grinding media, which are relatively new to Ore Enrichment Plants and require further research.</p> <p>The objective of this thesis was to give development suggestions to Ore Enrichment Plants on their purchasing strategy. The researcher analysed two different aspects helping to answer the Research Problem. According to the received and studied data it was important to determine the current purchasing strategy of high chromium grinding media is the company's experience of using the current purchasing strategy.</p> <p>The thesis project was initiated in November 2012 and was concluded in August 2013. Theoretical literature has been studied in October and November 2012 in order to support cooperation with KGHM Polska Miedź S.A. Studies included purchasing process, product characteristics, contracting, supplier selection and evaluation, quality control and industrial customer behaviour. Data was collected between December 2012 and May 2013. Data collection methods included e-mails and telephone consultation, and interviews at the company's headquarters. The research tools aimed at elaborating on the current and previous experiences in using certain purchasing strategies and finding the best way to suggest valuable improvements. Some improvement ideas were based on personal observations and judgement.</p> <p>It was found that the current purchasing strategy for high chromium grinding media is already well developed and a lot of attention is given to supplier selection and quality issues. Some development ideas were also given. One example are changes in the purchasing process by adding tender procedures, supplier database maintenance and purchasing strategy unification in relation to KGHM International in Canada.</p>	
<p>Keywords Purchasing strategy, purchasing process, quality in purchasing, supplier selection and evaluation, purchasing contract, high chromium grinding media, mining industry</p>	

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1 Introduction

This Introduction chapter gives the reader a view of the thesis topic background and the Research Problem. Researcher includes short presentation of the case company - KGHM Polska Miedź S.A - and key concepts that help to answer the Research Problem.

1.1 Topic background

The problem of purchasing strategy may cause at first some terminology confusion that should be settled at this point. Thinking of purchasing strategy may provoke a discussion whether it is the same as procurement strategy. Those two terms are often use alternatively. However, Lyson and Farrington (2010, 6) explain that difference between purchasing and procurement is that “purchasing is an act of obtaining goods and services by paying money for it and procurement is the process of acquiring goods and services in any possible way”. Therefore, procurement is wider definition that includes purchasing, also including product/service demand management, transportation, warehousing etc. Cousins, Lamming, Lawson and Squire (2008, 7-8) state that the importance of purchasing goes hand in hand with growing competitiveness. Purchasing departments are beginning to receive more attention and as a result they are now being perceived more as a profit-centred units. Purchasing became a value-added function, where all the money saved on purchasing operation are added as a company’s profit.

The following thesis is commissioned by KGHM Polska Miedź S.A, Ore Enrichment Plants with headquarters located in Lubin, Poland. The Company was interested in developing their purchasing strategy for a relatively new product, high chromium grinding media. The goal of research is to show a fresh perspective on purchasing issues with a core focus on supplier selection and evaluation, purchasing process, and some legal and quality aspects.

This chapter is also a good place to shortly describe the product of purchase, as not too many people are familiar with it.

High chromium grinding media are iron balls with a diameter of 10mm-12mm, that are used to grind copper and silver ores in industrial mills. They are used to maximize copper ore recovery from extracted materials. The chromium content in grinding media has a huge impact on the recovery rate of the flotation process. When the chromium content is more than 10% and the carbon content is within the 1.80% -3.20% range, the ball is a high chromium one. The picture of high chromium grinding media can be found in Attachment 1.

The concept of purchasing strategy will be studied starting from researching the current situation. In order to establish the current purchasing strategy, the researcher will conduct a qualitative research based on interviews with the Manager of Logistics and Sales Department. In addition, learning about personal perception, opinions and receiving a feedback will be of the utmost importance. The researcher will aim at learning about purchasing strategy effectiveness and development for KGHM Polska Miedź S.A, Ore Enrichment Plants.

The research will be of some benefit to stakeholders. The main goal of the research is to point out possible areas for changes and to show new directions. The goal is to develop a strategy that would be profitable not only in a financial sense, but most of all in a sense of process quality. The biggest advantage will stem from the fact that the purchased item is relatively new to the company and therefore, there is a lot of room for improvement. The case company will not be the only entity to benefit from the thesis. This will include potential suppliers as well. Because of the industry's characteristics and narrow, limited market potential business partners can gain a long lasting relationship based on mutual trust. That is why it is crucial to conduct high quality research that will open real, new opportunities.

The academic benefit to the Supply Chain Management will not be major, since many books and publications regarding purchasing strategies already exist. However, a new and interesting angle shall be taken, as not too many Business Administration studies get engaged with engineering topics. The combination of Supply Chain from the point

of view of both business and mine engineering can be an interesting reading for those who seek unusual case studies.

The research has a big impact on the author of this thesis. The topic continues to be a very interesting one for the researcher and reflects future career goals in Supply Chain Management. It will be an opportunity to network with an influential company that plays a major role in local economy by being the biggest employer in the region, one who makes a significant contribution to Polish gross domestic product.

1.2 KGHM Polska Miedź S.A. and Ore Enrichment Plants

KGHM Polska Miedź S.A is the 4th largest producer of copper and the largest producer of silver in the world. The company was established in 1961 and its headquarters are located in Lubin, Lower Silesia, Poland. (KGHM Polska Miedź S.A. 2012a.)

The graph featured below presents the organizational structure of the company. The purpose of introducing the reader to the company's structure is to show what is relevant to the research and that it is not focused on the entirety of the organization but only on one unit.

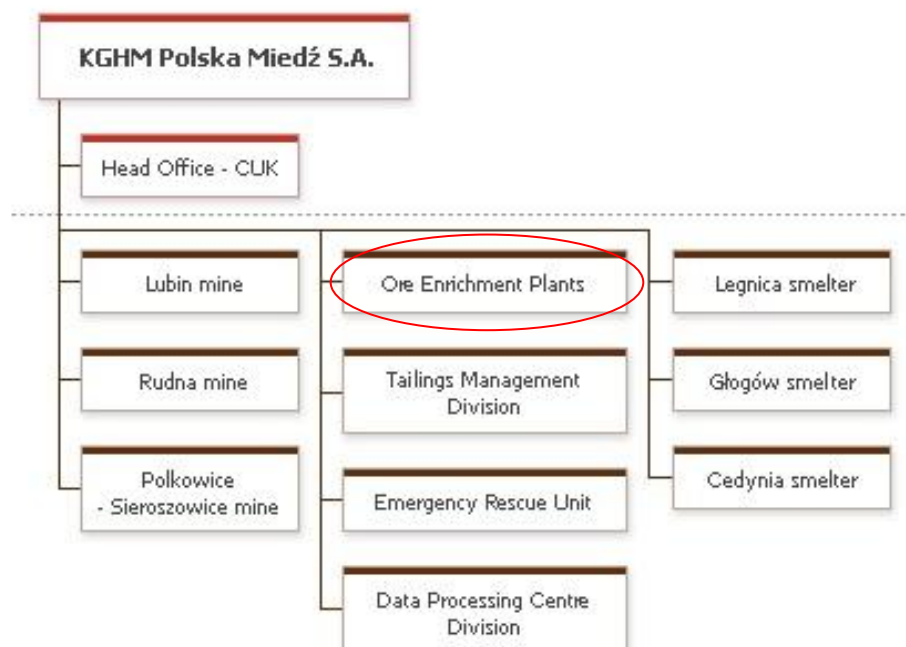


Figure 1. KGHM Polska Miedź S.A organizational structure (KGHM Polska Miedź S.A 2012b)

Judging from figure 1 it can be surmised that the structure of KGHM is currently composed of a Head Office, with an Accounting Services Centre and three mines: Lubin mine, Rudna mine, Polkowice-Sieroszowice mine. Each mine is accompanied by an ore enrichment plant that is independent from the mine and part of the Ore Enrichment Plants Division. Other than that there are the Tailings Management division, Emergency Mine-Smelter Rescue Services division and Data Processing Center that work independently from each other. Finally, there are three smelters: Legnica smelter and refinery, Głogów smelter and refinery and Cedynia wire rod plant.

The main operations conducted in KGHM are copper ore mining, copper production and production of precious metals and other non-ferrous metals. Furthermore, the organization has its strategy that it implements on all levels of activity. (KGHM Polska Miedź S.A. 2012c.)

The strategy of KGHM consists of five areas:

- improving productivity by investing in new technologies
- developing resource base by searching for new local and foreign deposits
- increasing the variety of revenue sources
- region support - creating new jobs
- developing know-how and seeking for opportunities for improvement

International aspect

KGHM Polska Miedź S.A. is a global producer of copper and silver with more than 50 years of experience. The goal of the company as a whole is to become a major global copper producer with production level of about 700 thousand tonnes of copper per year, while upholding business ethics, environmental protection and social responsibility. The company possesses one of the largest copper deposits in the world, ensuring the continuity of production in Poland for the next 40 years. All of its assets are spread throughout three continents. The company has development projects in Poland, Canada, Chile and Greenland. With the acquisition of Canadian company Quadra FNX, now known as KGHM International, the organization has become a global company whose brand is recognized around the world.

Some of the final products are listed on Stock Exchanges in London and Shanghai. In addition, refined silver has certificates of stock exchanges in London, Dubai and New York. KGHM Ecoren, the company that is part of KGHM Capital Group, is the only European producer of rhenium from their own source and the third largest in the world. For a detailed map of KGHM Polska Miedź S.A international activities, please consult Attachment 2, where the map key (legend) in Polish stands accordingly for: mining projects, mines, smelters. (KGHM Polska Miedź S.A. 2012d.)

Ore Enrichment Plants (OEP)

Ore Enrichment Plants was created in 1998 out of three enrichment plants located at three mines. The ore enrichment facilities have a special place in the process of copper ore production. "The goal of these facilities is to maximise metal recovery and to produce concentrate with the quality parameters required by the smelters, at the lowest possible cost". (KGHM Polska Miedź S.A. 2012e.) The Department of Logistics and Sales is responsible for all purchasing actions in OEP. For a simplified graph presenting organizational structure of Ore Enrichment Plants, consult Attachment 3.

1.3 Demarcation

The thesis topic was created by the case company after receiving the researcher's suggestions. The details and the table of contents were set by demarcation. It means that, as agreed with the company, the topic is narrowed down in order to fulfil requirements of the Research Problem and HAAGA-HELIA University of Applied Sciences thesis requirements. Moreover, research limitations can be viewed below.

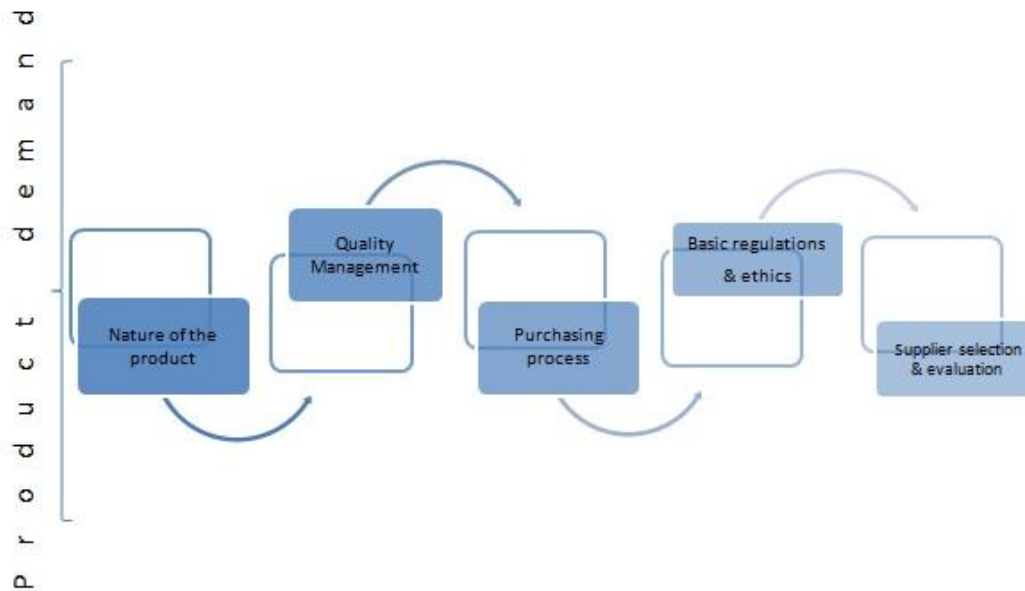


Figure 2. Research limitations

Based on Figure 2 it can be seen that the research is limited to the process of purchasing and the reasoning behind it. The demand management of the product is outlined, same as issues related to product transportation, storage and further usage. The main case to investigate is the purchasing activity with all supporting performances, such as legal issues, quality management in purchasing, supplier potential and evaluation. Some aspects were excluded from the research on purpose, to avoid terminology confusion between the concepts of purchasing and procurement. Despite the trends in the specialization field and strong companies' interest, e-procurement is not taken into consideration, since this particular purchasing strategy would be too risky financially.

1.4 Research Problem setting

One of the tasks of the Logistics and Sales Department in Ore Enrichment Plants is to provide the most accurate and profitable purchasing strategy of high chromium grinding media. Strategy is still in development as company is constantly seeking better solutions and new opportunities. The main task is to analyse current stage and propose directions for development and possibilities of improvement.

Therefore, the Research Problem (RP) is: **how to develop Ore Enrichment Plants' purchasing strategy for high chromium grinding media?**

In order to solve the problem it is necessary to answer the following Investigative Questions (IQ):

IQ 1. What is *Ore Enrichment Plants*' current purchasing strategy?

The purpose of this investigative question (IQ) is to describe current purchasing strategy by using following measurement questions:

- Global suppliers' potential
 - Supplier selection and evaluation
- Designing development plan for global supply markets and implementation
 - "Try and buy" method
- Basic rules for purchasing contracts
- Quality management in purchasing
- Purchasing process

When using tools listed above, the theory framework is a base.

IQ 2. What are the reasons for implementing current purchasing strategy?

The purpose of this IQ is to show the reasons for choosing certain purchasing strategies. It allows for presenting the uniqueness of purchasing process with long-term trials. It also allows the researcher to eliminate possible mistakes in giving recommendations by setting clear criteria for company expectations and needs.

IQ 3. What improvement suggestions can be given to OEP?

The purpose of this IQ is to present the researcher's suggestions for improvement based on theory framework and key findings.

For the overlay matrix presenting research content, please consult Attachment 5.

1.5 Key concepts

In order to answer IQs and RP it is important to decide which concepts will be helpful in conducting the research. The research will be based on the following purchasing and supply chain management concepts:

Purchasing strategy. Long-term plans for securing supply of goods or services to the company that are crucial for its operations and activities (Benton 2010, 133).

Purchasing process. Process can consist of purchase order specification, supplier selection, contract, order and evaluation. Purchasing process includes a number of certain documents, such as: order, contract, invoice, etc. Various companies can use various tools in order to create their own, efficient process. (Bozarth & Handfield 2008, 346.)

Supplier selection and evaluation. Supplier selection is conducted by a range of activities that allow to select the best possible supplier. Process contains a number of separate steps, such as, method of subcontracting, “bidders list”, request for quotation and analysis of the bids received, and, finally, selection. (Cousins et al. 2008, 61.)

Purchasing contract. Contract content depends on industry or product that has been purchased. The most important aspects of the agreement are: prices and terms of delivery, terms of payment, penalty clauses and warranty conditions. (Benton 2010, 45.)

Quality control in purchasing. “We speak of quality product or quality service when both supplier and customer agree on requirements and these are met” (Quayle & Jones 2001, 70-71).

1.6 Structure and conduct of the report

This paper consists of five (5) chapters. Chapter 1 introduces the reader to case company and topic background. Also, chapter 1 presents goals of this research by setting the Research Problem (RP) and Investigative Questions (IQ). Chapter 2 aims at pre-

senting relevant theoretical framework on which the research is based. The chapter consists of several theories and models related to purchasing strategy. Next, chapter 3 presents research methods and justifications for choosing certain methods. Additionally, data collection issues are explained. Chapter 4 focuses on the results of the research. Readers of this paper will find answers for Investigative Questions 1 and 2. Chapter 5 is a conclusion aiming at presenting key finding and presenting an answer to Investigative Question 3, where development suggestions were made. The list of references is available following that chapter. The reader may also view Attachments placed at the very end of thesis.

2 Purchasing strategies

Chapter 2 describes theoretical problems related to the purchasing strategy for high chromium grinding media. The chapter consists of 6 subchapters that will help in answering Investigative Questions 1, 2, 3 and finally the Research Problem. Theories of purchasing strategies and processes are presented at the beginning of the chapter in order to give an in-depth view of the investigative problem. Issues of supplier selection, evaluation, contracting and quality control are vital to present the reasoning lying behind the decision-making in purchasing strategy.

2.1 Role of purchasing strategy

Purchasing is responsible for supply and it has an essential role within every organization. It plays a vital role of linkage between vendors and purchasers, and provides a design of activities that lead to material movement. If it is done poorly it may lead to failures in company's supply chain, where the material does not arrive on time or at all, is of extremely low quality or it is simply overpriced. Excellent procurement management does not guarantee outstanding success, but there are many examples where poor managed purchasing lead to major failure. (Waters 2009, 304-305.)

Lyson and Farrington (2012, 4) claim that there is no clear definition of purchasing. Depending on the perspective purchasing can be viewed as a function, process, link in the supply value chain, relationship, discipline or profession. The classic definition of purchasing states that: "Purchasing means to buy materials of the right quality, quantity from the right source, delivered to the right place and the right time at the right price"(Op.cit. 2012, 5).

Weele (2003, 14.) explains that "managing the company's external resources in such a way that the supply of all goods, services, capabilities and knowledge which are necessary for running, maintaining and managing the company's primary and support activities is secured at the most favourable conditions". In other words, purchasing consists of all activities of the company for which an invoice can be given from outside parties.

The concept of purchasing is often confused with procurement, and is incorrectly used as a synonym. “By procurement we understand all activities that are required in order to get the product from the supplier to end destination. It includes: purchasing function, stores, traffic and transportation, incoming inspection, quality control and assurance”. (Weele 2003, 16.)

In order to fully understand the concept of purchasing strategy it is vital to explain that strategy means an action that is carefully planned and conducted for a clear reason with benefits to company. It can be also understood as a guideline or conditions. Therefore, purchasing strategy is understood as a long-term plan for securing delivery of the goods or services to the company that are crucial for its operations and activities. (Harrison & van Hoek 2008, 26.)

In supply chain management, purchasing has a crucial role and with it companies can develop a competitive advantage by: keeping close relationship with few suppliers and having open communication between supply-chain partners. In time purchasing has evolved to a key role by managing contacts between suppliers and customers. Nowadays, purchasing is also perceived as a function creating more value to the end customers. Companies that uses strategic purchasing can achieve higher responsiveness to the supplier and market needs, and are able to maintain friendly communication within supply chain. Moreover, bounding collaboration with suppliers and partners means gaining significant savings and increase in revenue. (Chen, Lado & Paulraj 2004, 505 - 508.)

2.2 Purchasing product portfolio

Kraljic’s Purchasing Portfolio Matrix compares profit potential against supply vulnerabilities. First of all, it is important to remember, that purchasing has an impact on profit (cost of materials, volume, impact on quality etc.). Additionally, there is always a supply risk (product availability, number of suppliers, substitutes etc.). By placing purchased product in the matrix, it is possible to consult suitable purchasing strategies. (Kraljic 1983, 112-114.)

The graphic below presents the purchasing product portfolio.

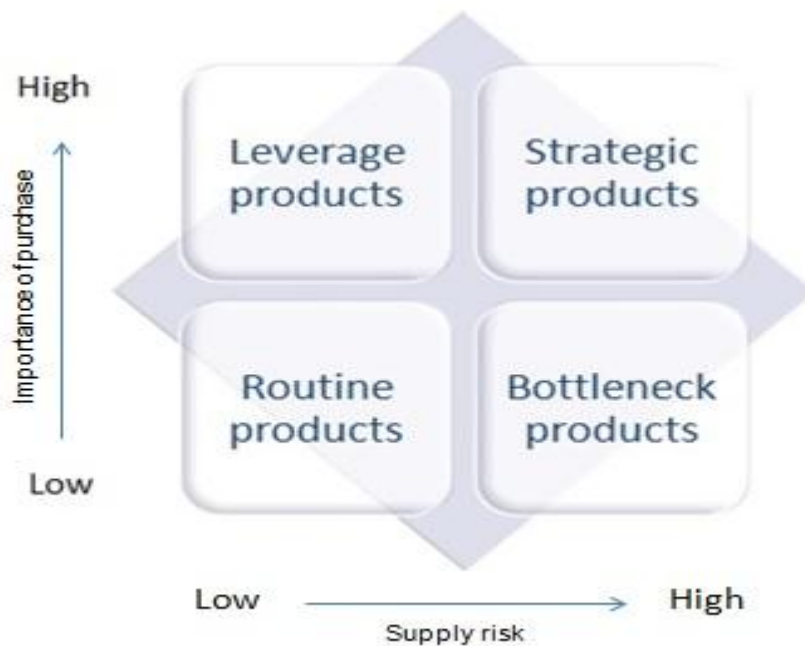


Figure 3. Purchasing portfolio matrix (modified from Weele 2010, 197.)

Figure 3 consist of four (4) groups of items. Moreover, the reader can observe relation between placing of a certain item and the item's importance and supply risk. Both of these factors can be low or high. Additionally, four presented items can be defined as follows:

Routine products are the least critical to business. Normally, these items are easily accessible in nature, represent low value and many suppliers are capable of providing them.

Leverage products are similar to routine products, except leverage products require higher financial involvement. These product are widely available, but they offer an additional possibility for cost reduction.

Strategic products are critical to a business. Value of these is rather high, therefore it causes an increase of attractiveness for potential suppliers.

Bottleneck products are characterized by a very high risk in purchase. Unavailability of those can cause decrease in profitability. There is also a very low variety of potential suppliers. (Caniels & Gelderman 2005, 143.)

2.3 Purchasing process

A process is described to be a set of activities having inputs and outputs, beginning and end, and usually the process is occurring in a certain sequence. Purchasing process is not about carrying out strategic and long-term execution, but focusing more on the operational level in everyday buying. (Johnson, Flynn & Leenders 2011, 78.)

According to Bozarth and Handfield (2008, 346.) the purchasing process includes eight stages presented in the graph below.

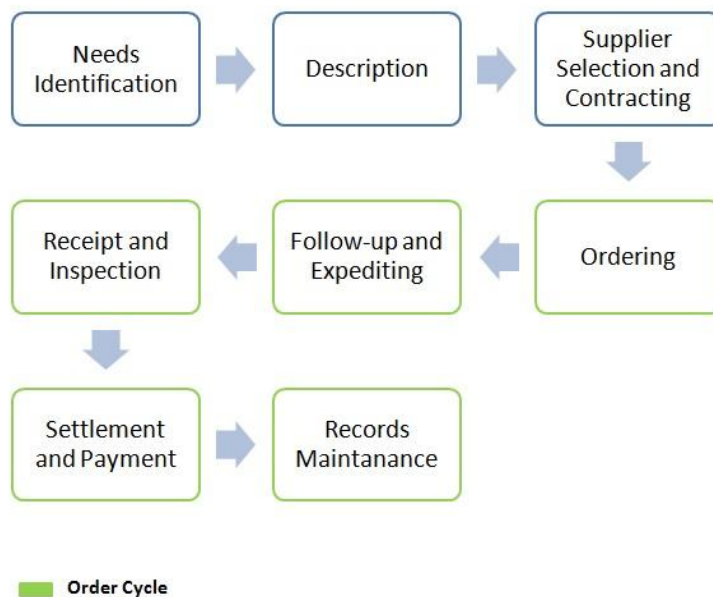


Figure 4. Purchasing process (based on Bozarth & Handfield 2008, 346.)

Figure 4 presents each of these phases connected in different ways. To get a good grasp of the purchasing operation, each of these phases needs to be described in detail. Without the proper pursuit of these phases, purchasing will not be as systematic and coordinated as it should be, leading to various operational problems.

Stage one: Johnson et al. (2011, 80.) point out that a purchase is initiated when a particular need for a certain product or service appears in a company. This need defines what, how much and when. At the initial stage a company makes a decision whether to make or buy a product and needs to determine what activities will be purchased.

Stage two: It is important to remember to communicate company's needs and expectation to suppliers effectively and transparency.

Stage three: Company should decide whether potential suppliers are suitable for further cooperation. Selection requires a number of steps: a method of subcontracting, a “bidders list”, a request for quotation and an analysis of the bids received and finally selection. The most wanted outcome of this stage is a list of desired suppliers. (Weele 2003, 29.) Moreover, Bozarth and Handfield (2008, 348) point out that a firm may maintain a list of preferred suppliers. When it comes to contracting with the chosen supplier the most important aspects of the agreement are: prices and terms of delivery, terms of payment, penalty clauses and warranty conditions. “A preferred supplier is a supplier who has presented its performance capabilities through previous purchase contract, and therefore receives preference during the supplier selection process”(Op. cit. 349).

Stage four: After signing the agreement the order can be placed. This begins the order cycle (Figure 4 above). The order cycle is completed once the goods or services are received, the supplier receives his payment and the order has been placed in the firm’s database. (Op.cit.351.)

Stage five: Purchasing personnel is obliged to monitor the status of purchase order

Stage six: Once goods reach destination it is vital to inspect them to ensure that right product has been sent in right quantity and quality, and that there is no damage.

Stage seven: When the product or service is delivered, the buying institution must finalize payment. It is usually made through the firm’s account directly to the supplier’s account.

Stage eight: After purchase is finalized, a record of critical matters related to the purchase should be recorded into the supplier’ database. These data can be later used for future co-operation and negotiations. (Op.cit.352.)

2.4 Analysis of global supplier potential

It is vital for each company to find business partners who have the capacity to deliver the best quality and desired performances. In order to ensure fruitful co-operation organizations take various action before making decisions about future suppliers and partners. In this subchapter, the researcher will present some tools of examining potency. This part consist of both supplier selection and evaluation.

2.4.1 Supplier selection and evaluation

“Arguably, the most important part of purchasing is finding the right supplier – and the general advice is that a poor supplier causes more problems than poor materials”(Waters 2008, 311). In order to ease purchasing processes in organization it is vital to find a well-qualified supplier. This means that such supplier should be financially secured, is willing to create a long-term relationship, has suitable ability and capacity to perform desired actions, has experience and expertise, his lean management is mastered and he quotes acceptable prices. (Op. cit. 311.)

According to Cousins et al.(2008, 61.) strategic supplier selection involves four stages:



Figure 5. Strategic supplier selection (based on Cousins 2008, 61.)

As presented in Figure 5 above, the main goal of the first step is to meet desired product and process standards and make sure they fulfil buyer’s objectives. It requires documentation traffic, such as a request for quotation, a request for proposal and a request for information. (Cousins et al. 2008, 61.) The second step is to select supplier criteria. Commonly set criteria in literature are shown in following table.

Table 1. Criteria for supplier selection (modified from Cousins et.al, 2008, 63.)

Cost	Quality	Delivery	Flexibility	Others
<ul style="list-style-type: none"> • Unit price • Pricing terms • Exchange rates 	<ul style="list-style-type: none"> • Quality system certification • Quality circles • Continuous improvement • ISO 9000 series 	<ul style="list-style-type: none"> • On-time performance • Lead-time • Delivery frequency • Minimum lot size • Location 	<ul style="list-style-type: none"> • Supplier flexibility 	<ul style="list-style-type: none"> • Financial risk analysis • Ethical analysis • Environmental analysis • E-commerce capability • Reputation • Innovation

As shown in Table 1 companies may create their own criteria for supplier selection. The choice of criteria depends on the company's needs, priorities and goals. The researcher presents five (5) groups of criteria, that are commonly chosen by companies worldwide. Listed groups are: cost, quality, delivery, flexibility and others. In each group there are several criteria belonging to a "pool" of tools that fulfil particular group. "Costs" include: unit price, pricing terms and exchange rates. The rest of the groups are composed in a similar manner. For example, the ISO standard can be found in the "Quality" group. "Delivery" includes lead time and delivery frequency. "Flexibility" includes supplier flexibility. "Others" typically consists of all other criteria that do not fall into other groups, but are also very important for the company. Among them can be found ethics, e-commerce and environmental issues. The third stage is to gather information from suppliers that help to compare the criteria among all suppliers. In addition to general information about the supplier and supplier's actions, companies can also visit supplier's facilities to measure its performance. (Cousins 2003, 67-68.) The last step is the most important for the whole process. The decision which supplier is the most suitable to fulfil the company's needs is crucial for future performance. A supplier can be eventually selected by three criteria: innovation, quality or price. Naturally, buyers tend to evaluate their suppliers or manufacturers by looking at the price. However, this is not always made consciously. For an efficient supplier evaluation the buyer should start from creating performance indicators. This will help to create criteria needed for future evaluation. In case of huge range of suppliers it is recommended to group them according to function. Some check lists and tables can also be of use. (Op. cit.70.)

In order to evaluate suppliers it is possible to use one of many existing models, for example the multi-criteria supplier evaluation. For the purposes of this thesis, the researcher has created the following graph based on theoretical knowledge and experience.

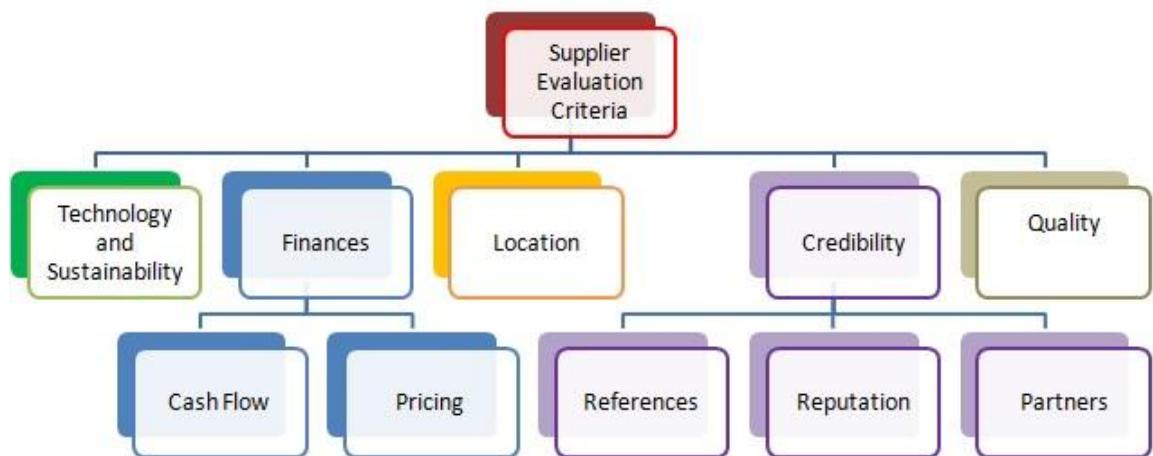


Figure 6. Model for multi-criteria supplier evaluation (based on Horvath & Madoranova 2013, 120-127.)

From Figure 6, presented above, the reader can see that when evaluating suppliers company can set certain criteria for evaluation. This particular models consist of five groups: Technology and Sustainability, Finances, Location, Credibility and Quality. Each of these groups can have sub-criteria and examples are provided under each group. Evaluation criteria do not have any standards or setting guidelines and can be as flexible as company needs. There is a possibility of adding extra criteria according to the importance of the supplier’s characteristics to the company.

2.4.2 Quality control in purchasing

Quality of the product is determined by its design. As a quality we can understand “the degree in which the requirements are met”.(Weele 2003,191.) According to Quayle and Jones (2001, 70.) quality is a key to the company’s success and to the future of its employees. Quality control includes all actions that will bring a product desired quality. The purpose of said control is to ensure a suitable level of supplier quality and its products. “There are various elements involved in a quality approach towards the supplier: preparation of the purchase order specification, preliminary qualification, sample inspection procedure, inspection of first preproduction series, inspection of first production series, quality agreement and certification, periodic verification”(Quayle &

Jones 2001, 70-71). It is also a common practice to assess quality by conducting audits. Ford's Q101 is one of the best known and often used system of audits. In this system the supplier is asked to answer questions related to about 20 subjects. Answers are awarded with points between 0-10. The total score gives an indication of the quality. (Weele 2003, 191-201.)

ISO 9000 standards also have a big role in managing quality. Nowadays, some companies are assessed by an independent organization. It is done in the context of quality certifying program. A certificate is a proof that this particular company is capable of performing activities that comply with the program's quality. The family of ISO 9000 standards includes: ISO 9000, (i.e. guidelines of selection and application), ISO 9001-9003, (i.e. requirement concerning quality control in purchasing). ISO 9004 consist of guidelines for the organization of a quality system. The last is ISO 8402 which consists of terminology and definitions. (Weele 2003, 199-200.)

Another concept worth mentioning at this point is Total Quality Management (TQM), that nowadays is widely used by companies. Total Quality Management can be defined as an integrative approach to management that supports the attainment of customer satisfaction through a wide variety of tools and techniques that the end result is higher quality of goods and services (Bateman & Snell 2007, 302). Some academic books explain, that TQM is a continuous improvement process (Benton 2010, 255). TQM is considered a hard task that companies have to face in the free market. With an emphasis on achieving business excellence and building up competitive advantage, companies have to be prepared to face their competitors by constantly improving their strategy. (Richards 2012, 37.) TQM forces the organization to make sure that their products or services are always up to standards. It is vital, that TQM requires an active commitment and involvement into quality from the entire organization. There is also a huge need for "a never-ending push to improve the product or the service, the second is to require all personnel's involvement and the third, the most important one, is customer satisfaction". (Stevenson 2009, 427.)

2.5 Negotiations and purchasing contract

After the company chooses its supplier, the next step would be negotiating and preparing a contract. Purchasing professionals treat buying products as a career, that is why it is usually them in the company who sign all purchase orders and contracts committing the company to adhere to certain rules and conditions. Therefore, it is crucial for them to understand legal matters in daily basis transactions and improve legal skills desired in purchasing officers. Once the contract has been negotiated and signed it is the purchasing manager's responsibility to ensure proper conduct of the contract and to avoid any actions leading to breaching a contract. (Bozarth & Handfiels 2008, 350.)

Purchasing contract should include at least: the title of the product or service and the personal details of both the buyer and the seller. In addition, the contract includes prices and terms of delivery, terms of payment and penalty clauses and warranty conditions usually offered for a certain period of time. Alternately, the purchasing agreement includes typical contracting elements, such as general terms (date and place included) , the object of sales and compensation for damage. Finally, the contract should be signed by both parties to make it valid and binding. (Benton 2010, 47-53.)

2.6 Ethics in purchasing

Every company commits their employees to same standards such as company's methods or rules and tries to ensure that the purchasing process is as fair as possible. The relationship between purchasing professionals and their suppliers may lead to close interactions, this is why purchasing officers must be as ethical as humans can be. The way of purchasing has major impact on the whole organization and may add a value to company's reputation and success. Therefore, all employees should be able to make moral decisions and decide what values are more important. As a rule, big companies have a code of ethics that every employee must sign and apply when a given course of action is implemented. (Landeros & Plank 1996, 789.)

Ethical purchasing allows to maintain the company's reputation. Organizations investing in their procurement ethics very often can engage in stronger relations with their

suppliers and business partners, and boost their social responsibility by building up trust among stakeholders. “Accepting business meals, gifts and bribes, preferential treatment for certain suppliers or bidders, (...) allowing personal likes or dislikes to enter into negotiations have all been identified as ethical issues”. (Op. cit. 790.) Moreover, individual ethical decision-making has an impact on business behaviour. With increasing competitiveness companies maintain a challenging ethical environment. Unethical behaviour in purchasing is treated even more strictly due to high amount of money involved. Inappropriate behaviour may damage relations inside the company and also with suppliers or other business partners. (Ho 2012, 72.)

3 Research methods

This chapter consist of two subchapters. Firstly, the researcher will present research design and justify the research method choice. Secondly data collection process will be presented.

3.1 Research methods and design

In order to answer the Research Problem it is necessary to find suitable tools. For the needs of this thesis a **qualitative research** was conducted. This method helps to answer the questions *why?* and *how?* Answering these questions is crucial to estimate current situation of the purchasing strategy and its effectiveness. This research is based on meanings expressed by words. The data collected are non-standardized and require categorization.

According to Saunders, Lewis and Tornhill (2003, 378.) qualitative research methods should be chosen for deeper understanding of the phenomen. The method's characteristics fullfill all criteria of thorough Research Problem solution. Maxwell (2005, 2.) pointed out the key criteria for qualitative research design:

In a qualitative study, the activities of collecting and analyzing data, developing and modifying theory, elaborating or refocusing the research question, and identifying and dealing with validity threats are usually going on more or less simultaneously, each influencing all of the others. In addition, the researcher may need to reconsider or modify any design decision during the study in response to new developments or to changes in some other aspect of the design.

Qualitative research focuses mainly on analysing data, that are expressed by words through interviews or focus groups. Qualitative research also includes analysis of texts and documents. (Bryman & Bell, 2003, 280-282.)

The graphic below presents the relation between research methods and IQs (presented in section 1.3). The reminder of the RP and the IQs is presented below.

The RP is: How to develop Ore Enrichment Plants' purchasing strategy for high chromium grinding media?

The IQs are:

1. What is the current purchasing strategy for high chromium grinding media?
2. What are the reasons for implementing current purchasing strategy?
3. What improvement suggestions can be given to Ore Enrichment Plants?

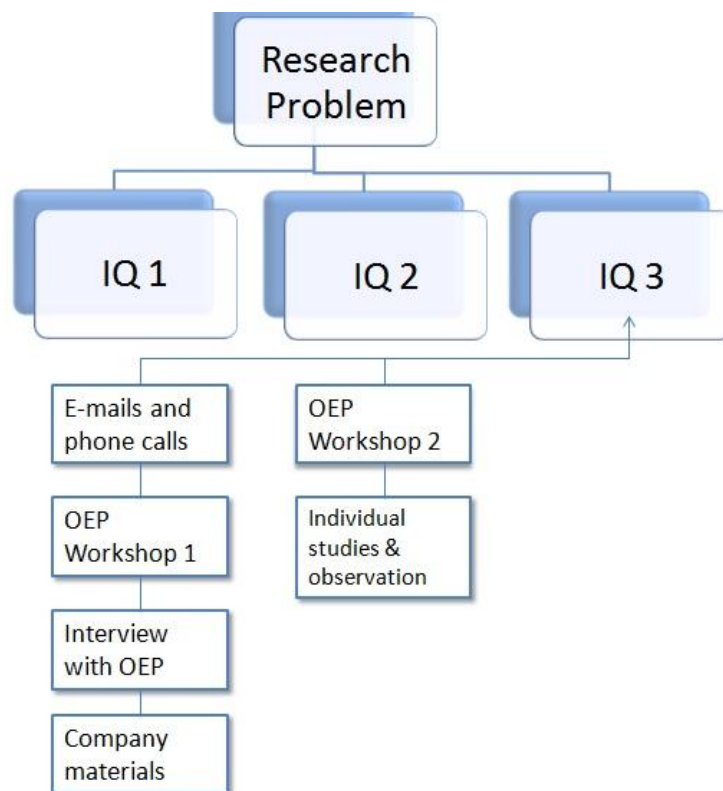


Figure 7. Research design

As it is presented in Figure 7 above, different research methods were used to answer IQs. Because of the industry and product characteristics (engineering characteristics), research was conducted with a strong cooperation with the company. The *First group* of tools includes the exchange of e-mails and phone calls with the company's representative in the Department of Logistics and Sales. Workshop 1 was conducted with the Manager of Logistics and Sales Department in attendance, where the researcher could familiarize with rules and techniques used in purchasing. One of the tools was a series of unstructured interviews with the Manager of Logistic and Sales

Department. A coffee table talk was chosen as the beginning of the research. Its purpose was to provide an easy start for the investigation. General information and big picture presented gave the researcher an idea of how purchasing strategy looks like and a goal for further research. The greatest advantage of an unstructured interview is being able to avoid closing the discussion in frames. This gives more opportunities for further research and opens new door for concepts that were omitted. The unstructured interview was a driving force for personal observations and analysis that helped to understand the processes in the company. (Saunders et al. 2009, 321.) Additionally, the research was supported by individual studies of materials provided by company consisting of several PDF files regarding purchasing strategy in KGHM Polska Miedź S.A. These materials created a base for narrowing the problem to particular company's division and also to only one product. The answer to IQ1 can be found in chapter 4, subchapter 4.1. The *Second group* consists of workshop 2 where the researcher could get information needed to understand the reasoning behind implementing current purchasing strategy. Based on personal observations and materials gathered through the research some conclusion have also been made. In addition, the last workshop was intended at filling information gaps that the researcher met throughout the process. Moreover, the researcher and the Manager of Logistics and Sales Department stayed in contact through the whole thesis writing process via e-mails. The results of IQ2 can be found in chapter 4, subchapter 4.2.

Both groups of tools were vital to deeper understanding of the problem and providing improvements given in IQ3. The results and problem solving can be found in chapter 5, subchapter 5.2.

3.2 Data collection

Both primary and secondary data collection are used in thesis research. In terms of this research, by secondary data we understand documents provided by company, such as public documents, documents that are usually not available to the public and various guidelines and policies. By primary data we understand series of interviews, discussions and exchange of e-mails. The most significant advantages of such secondary data are their credibility and accuracy. (Bryman & Bell 2003, 403-407.)

Internet is used as a source of data collection. In this research paper, web pages were used in order to familiarize researcher with the company and its structure. The researcher referred only to the company's official site. The Internet eased communication with thesis coordinator. The advantages of Internet communication are the facts that distance is not an issue and information can be obtained in relatively short time.

The IQ1 was answered also through the workshops at the company's premises in Polkowice, Poland. Workshops were combined with opportunities to conduct unstructured interviews and coffee table discussions. The first meeting took place in December 2012 and second one followed in May 2013. Meetings aimed at collecting relevant information required to describe the current purchasing strategy for high chromium grinding media. The first meeting provided general information and a big picture of the situation. Workshops were intended for studying several materials and performances that could not be reviewed outside the company's premises. The second meeting included deeper and detailed questions aiming at filling gaps in previously received data.

The IQ2 was partly answered during workshops and interviews. In order to answer IQ2 to the fullest extent possible it was necessary to conduct individual observations based on materials and notes gathered. The most important criterion for observation its relevance to the problem.

4 Results

Chapter 4 is dedicated to present results of the research. In subchapter 4.1 the researcher shows current purchasing strategy of OEP for high chromium grinding media (IQ1). In subchapter 4.2 the researcher presents reasons for implementing the current purchasing strategy (IQ2).

4.1 KGHM Polska Miedź S.A current purchasing strategy

The main goal of Ore Enrichment Plants purchasing strategy is a rational use of human and financial resources and savings maximization. It is accomplished by lowering the price of operational purchasing costs and guaranteeing transparency of decision-making in purchasing. The key issue is keeping the 100% rate of timeliness of delivery. In general, it is highly desired that OEP's purchasing strategy is constantly building advantage over competitors, entering long-term oriented relationships with clear results. It should be a tool that support communication, decision-making and commitment. OEP's representatives believe that good strategy will assure better communication across the company and cause an increase in interest among stakeholders especially in the case of divisions and functions where the staff participates in the development of strategies.

The objectives of purchasing strategy include purchase planning, estimation of purchasing policy and unification of technical standards for purchasing process.

Ore Enrichment Plants is obliged to carry out purchasing actions in line with the law. Compliance with the rules is a key to effective purchasing process.

4.1.1 Ethics in purchasing strategy

The Code of Ethics contains rules and standards of professional conduct in the process of purchasing. The observance of certain rules is essential in order to maintain the efficiency of procurement processes and to assure shareholders, suppliers and other stakeholders about the professionalism and integrity of the company.

First of all, protection of personal data stays in the company's interest. All data regarding clients, suppliers are protected and employees cannot provide them to any contractors. Moreover, employees cannot enter any contracts where one of the party would be a family member, unless the Executive Manager allows that in a written form. The Employee cannot make recommendations to the company, where family member or other person close to him for any reason is strategically involved in operations and may affect the outcome of the contract. The third rule is that employees must inform their supervisor about any conflict of interest that may occur between them and a potential supplier. This helps at maintaining credibility with suppliers.

Additionally, employees must treat all suppliers equally in a manner that does not limit free competition. It is strictly prohibited to inform other employees or potential contractors about offers submitted in tender procedures. Purchasing officers should carry out the contract properly and during that time they should expect same quality performance from the contractor.

Last, but not least, it is strictly forbidden to accept bribes. An employee is required to inform his supervisor in written form about any form of bribe attempts made by a potential supplier. Also, it is improper to accept any bribes in exchange for favourable terms of contracts or the contract itself. Accepting any of the above may affect the company's good reputation and be a proof of unequal treatment of suppliers. Such behaviour is treated as a serious misconduct by the Labour Code.

4.1.2 How does high chromium grinding media affect purchasing strategy?

At first, it is essential to categorize the product according to its importance to the company. According to the company's politics, high chromium media are a central buy, monitored by Central Purchasing Office. As a central buy they are a grouped purchase performing at least one of the conditions: a contract with an estimated value exceeding 3.000.000 PLN (about €725.000), an order that benefits to more than one department, an order that saves money and is important for strategic reasons.

Moreover, according to Kraljic's product portfolio high chromium grinding media are considered as *critical/strategic product*. As reported by the company, it is forecasted, that product will have high impact on profitability and productivity. Moreover, OEP seek long-term relationships with suppliers based on mutual trust. The objective is to create bilateral commitment. OEP believe that a close and stable relationship can lead to an improvement of quality or lead time. Supply risk is rather high. There are some supplier alternatives, however, switching requires time and financial commitment.

When considering the characteristics mentioned above, it is essential to acquire access to technology and expertise of the supplier. In addition, there is a need for coordinating development strategies with technical roadmaps. Strategic cost analysis with indexation (the inflation rate) is also of critical importance. Last, but not least, are contracts that can be medium- or long-term and signed for a period of 3-5 years.

Furthermore, purchasing high chromium grinding media is a new task situation for OEP. The product is relatively new and still in the test phase and it is purchased from new suppliers and thus it requires high involvement from OEP. Purchasing officers are engaged in various tasks in order to secure high quality supply. OEP's purchasing officers are professionals who have received education relevant to their position. Their expertise and knowledge allows them to cope with those suppliers who also represent professional values. Only companies with good reputation and highly valued in the mining industry environment as experts are allowed to be OEP's business partners.

4.1.3 Central Purchasing Office

Purchasing co-operation between Ore Enrichment Plants and its partners is coordinated and monitored by the Central Purchasing Office (CPO). It derives from the fact that the company distinguishes two types of purchase: central and local, and CPO is responsible for working out standards for central purchases and high chromium media are considered as such. CPO is responsible for control of purchasing planning, managing agreements and carrying out contracts through the purchasing process.

CPO was created in 2009 as a response to ineffective purchasing strategy that, as stated by the Board, was encouraging abuse of purchasing procedures. To increase CPO's effectiveness it is supported by an IT system that helps to carry out purchasing activities.

Currently, all departments and companies within the Capital Group are obliged to submit all purchasing plans to the CPO. CPO chooses only the ones that are qualified as central buys and thanks to that it is able to negotiate lower prices due to the volume of orders. 40 employees of CPO not only draw up the specifications of the contract and the content of the tender notice, but is also responsible for order parameters that are essential for the applicants and confronting them with potential solutions available on the market. When the auction is settled, OEP can enter into a separated agreement with a supplier who has won a tender. Agreement is based on OEP's needs.

High chromium grinding media are indicated in the central purchase plan that includes all needs for the following calendar year. Planning aims at defining purchasing tasks. Therefore, it is important to estimate how many tonnes of the item is needed in order to secure the production process. The purchase plan is designed in a table form where all items are grouped. The plan needs to include at least type of the order (delivery), name of the order (high chromium grinding media and short description), estimated price and volume, terms of delivery (expected date of delivery and contracting date).

CPO is responsible for coordinating purchasing strategy in the entire organization, along with development and implementation of supply chain strategy. The Department of Logistics and Sales is obliged to consult the CPO regarding central purchasing actions and to carry out performance in line with the rules stated by internal regulations. At the request of CPO, OEP is obliged to prepare relevant information and reports for the needs of purchasing planning, commitment to agreements and monitoring purchasing process. OEP should also make available possessed knowledge and know-how in the purchasing field in order to enrich knowledge base and good practices carrying out by the CPO.

4.1.4 Purchasing process

The theoretical framework presented in Chapter 2 explains that the purchasing process includes several stages and steps. Likewise, Ore Enrichment Plants' purchasing process is similar. The graph presented below is a valuable visualization of the purchasing process in the company.

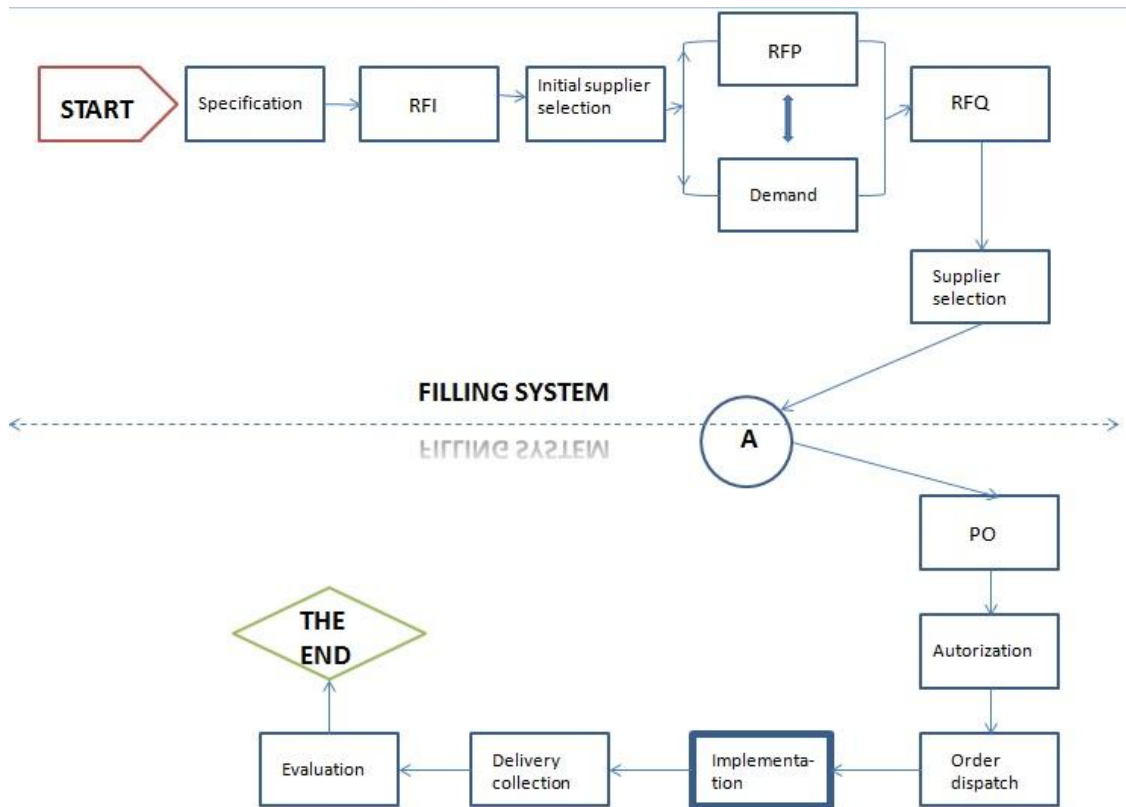


Figure 8. High chromium grinding media purchasing process

Definitions of abbreviations:

- RFI (Request for Information)
- RFP (Request for Proposal)
- RFQ (Request for Quotation)
- PO (Purchase Order)
- A (Agreement)

Purchasing process starts with specifying what product is needed and what characteristics it should have to fulfil OEP's requirements. Specific character of the item is described in subchapter 4.1.5 regarding quality issues. Specification always starts up the procedure.

Request for Information (RFI) is sent to several suppliers in order to collect information about suppliers' capabilities. Normally an RFI is used for comparative purposes. Attractiveness of a given supplier is determined by prestige, good financial situation, innovative technologies, willingness to enter long-term relationships. On the other hand, what deprives supplier attractiveness is excessive bureaucracy, weak planning strategy, difficult conditions of contracts, frequent changes in personnel, lack of professionalism. Active involvement is a vital factor for OEP. The company highly values good communication through being specific when answering phones and replying to e-mails on time. It happens often, that potential partners make initial contact with OEP and express willingness to engage in a relationship. In this case it is vital to investigate the offer more carefully, hand in hand with a research on a potential partner's capabilities.

After information is collected and analyzed initial supplier selection can be made. A Request for Proposal (RFP) is sent to all selected buyers. An RFP is an invitation for the suppliers to participate in the tender process, which aims to provide a particular product or service. It must be sent to at least three potential suppliers. The number secures free competition and selection of the best offer. Each supplier can submit one offer. An RFP is strictly tied with demand, as OEP has a specific production capacity. Additionally, it can be supplemented with additional questions and discussions with suppliers. At this stage, the Request for Quotation is the last possibility to change the offer in the last step of negotiations. An RFP is also partly discussed in subchapter 4.1.6 'Supplier selection and evaluation'.

Finally, choice is made and a final supplier selected. For further information regarding supplier selection, consult subchapter 4.1.6 "Supplier selection and evaluation". Selection is followed by an Agreement and signing a contract. Detailed contract characteristics can be found in subchapter 4.1.7 "Negotiations and purchasing contract" subchapter. After signing the agreement a Purchase Order (PO) is place, which typically includes product type, quantity and price. Every purchase order must be viewed and authorised by the CPO. After that, the product is dispatched and later on collected by OEP. As an example, high chromium grinding media sent from Canada are trans-

ported by water to Great Britain and from there moved by trucks to Poland. After receiving the ordered item, it typical for a supplier evaluation to take place. The purpose of evaluation is to give a feedback on co-operation effectiveness. High scoring may lead to further collaboration or a long-term relationship. Each of the presented stages needs relevant documentation. All documents are entered into a database.

4.1.5 Total Quality Management and Quality Control

In Ore Enrichment Plants it is important to manage quality in purchasing process.

Every aspect is carried out while taking into account the pro-quality outlook.

It is possible to determine division of competences in organization regarding purchasing process based on Total Quality Management. The graph below presents the relation between the range of competences and tasks in a purchasing process.



Figure 9. Competence division based on TQM

Figure 9 shows that the Management Board (later called Board) ensures implementing and functioning of policies. The purchasing process is conducted based on general rules. Likewise, the Board secures transparency of the process. Central Purchasing

Office designs and implements purchasing strategies stated by the Management Board. Additionally, CPO controls purchasing process in whole organization, such as supplier selection, contracting, analysing market research. Next, that process is filled by organization implementing tender procedures and supporting purchasing performances by product specification, order, transport, invoice and payment. Moreover, it is vital for the process to keep clear communication aligned with procedures. The graph above presents involvement of all employees in continuous improvement. It is crucial that quality is offered by the Management Board, Central Purchasing Office, workforce and suppliers.

Furthermore, organization controls purchasing process to ensure that the ordered product meets the requirements. There is a list of specific characteristics that needs to be completed if we want to talk about quality high chromium grinding media. Ore Enrichment Plants search for those sources that can deliver item with 14% or higher chromium content. There were some sources offering lower content and those have been disqualified as potential business partners. Moreover, product specification should include certain hardness, shape, structure and heat treatment. All of the above must be proven by a detailed documentation of laboratory tests and results. After all requirements are fulfilled, high quality and value is delivered to OEP.

At the same time company highly values ISO 9001 regulations. Quality certificates are not obligatory for the potential suppliers, however, they are viewed as an asset. Unlike mentioned in theory, company does not perform audits at a supplier's premises. Audits are commonly used control tools, however, they are never carried out before the purchase. It bears noting that the company always makes sure that high chromium grinding media is delivered in right quantity. OEP has stronger bargain position, taking into account quantity and value of the orders, that is why it is requested to perform weighing at the company's premises with a use of their scale. The truck driver is always present at the weight in of the product to secure right volume and expected quality.

4.1.6 Supplier selection and evaluation

It is vital that all suppliers are treated equally in a way that does not limit free competition. All employees commit to terms of agreement with suppliers and at the same time they demand that suppliers fulfil the order.

Selection of supplier for high chromium grinding media takes same steps as presented in theory in Chapter 2, subchapter 2.4.1. However, in company case there is one extra step called ‘pre-qualification’. Pre-qualified suppliers are firstly invited to tender procedures in restricted mode. In case of high chromium grinding media we say about Request for Proposal (RFP). Before OEP settled for this tender method, single source procurement had been tried out. However, it was not viewed as the best way of purchasing in terms of free competition. Single source procurement has limited competition and in result gave less alternatives. That caused changing strategy, that is in also in favour of a buyer.

Only those suppliers who are qualified to perform assigned activity, who possess suitable knowledge, experience, technical and manpower potential are granted the contract. Potential suppliers must be in stable financial situation securing performance. As officially stated, the last obligatory condition is not being in a litigation with KGHM Polska Miedź S.A. and that there is no ruling that shows that KGHM Polska Miedź S.A. is entitled to claim damages from their suppliers. However, penalties do not eliminate supplier fully. Despite of “black list” of suppliers, the reality is that certain limitations exist only on the paper. It is rather difficult to disqualify suppliers, even if they have penalty imposed by KGHM Polska Miedź S.A.

There are also other conditions excluding suppliers from tender process. A natural legal person who wants to take part in tender process cannot be previously legally convicted of a crime in connection with the award of the contract and against economic circulation, offense against the rights of people performing paid work or other crime committed for financial gain. Moreover, it is possible to exclude those suppliers who are brought into liquidation or bankruptcy, in past three years did not carry out the

contract or did that improperly, do not pay taxes, insurances etc., deliver false information that can have an impact on the tender's result.

When it comes to supplier selection, OEP's Department of Logistics and Sales is the one responsible for assessment of suppliers qualifications. When assessing suppliers OEP take into account following criteria:

- Pricing
- Technical and technological expertise
- Quality of delivery process
- Terms of delivery
- Business and marketing strategy
- Environmental requirements (ISO 14001, 18001)
- Term of the contract
- Financial situation
- Reputation and organizational culture
- References
- Experience

The most suitable place to find a supplier is within the European Union, where law regulations are unified, especially when considering customs and taxes. However, supplier location is not a determining criterion and there are no limits in geographical sense. OEP has recently received offers from Ukraine, China and Greenland, and all of them had been considered.

All mentioned aspects are vital when co-operating with suppliers from abroad. In case of high chromium grinding media potential suppliers were coming from Europe and Asia. That is why when thinking of international market analysis it is essential to take into account the impact of fluctuations in foreign exchange rates, what are barriers of entering and leaving, distribution channels, issues of transportation and lead time. Lead time is important in particular for organization, as securing continuity of production is a major issue. That can be protected by receiving high chromium grinding media on time. Lead time is considered as the strongest indicator. Normally, it takes about three

weeks to finalize an order in Poland, but for foreign suppliers it takes longer, from six to twelve weeks. That's why is it necessary to begin purchase procedures at least three months before supply ends.

Because high chromium grinding media are relatively new to Ore Enrichment Plants, so far four sources were tested:

- Vega, located in Great Britain
- Magotteaux, located in Belgium
- Ningguo Jinhong, located in China
- Christian Peiffer Maschinenfabrik GmbH, located in Germany

The third listed supplier from China was rejected due to unsatisfying quality conditions.

The “Try and buy” method is commonly used. This method involves purchasing samples and after certain period of time there is a possibility of purchase bigger volumes after various examinations. OEP has received twice the amount of 110 tonnes of high chromium grinding media samples from Vega, India and currently they are being tested. Samples are always paid. OEP has also an agreement with Quadra FNX Mining Ltd. in Canada (the latest acquisition of KGHM Polska Miedź S.A., that changed name to KGHM International) regarding high chromium grinding media. Contract was signed after familiarizing with the company's principles and methods.

OEP provides two evaluation methods: ratio analysis and Delphi analysis. Ratio method is based on building indicators. For high chromium grinding media two main the indicators are the use indicator and the effectiveness indicator. Some of the other criteria are: production ability, elasticity, quality, quality control management, financial structure, product life cycle, localization of the product, technology, distribution abilities, quality of service. Ratio analysis is based on benchmarking. Delphi analysis is based on commenting contracts. A questionnaire is sent to technological users once the period of co-operation ends. In the form users can express their feelings about the product and comment on it. Results of the questionnaire are calculated by a weighted

mean, where instead of each of the data points contribute equally to the final average, some data points contribute more than others. Examples of supplier evaluation forms can be found in Attachment 4.

If the co-operation turns out to be fruitful and satisfying for both parties, the supplier is registered in the database of qualified contractors (within the Central Register of Entrepreneurs). Such database consists of data of those suppliers who have been awarded the contract and carried it out in an exemplary manner. The database is reviewed once in a year. The supplier may be temporarily excluded from the database if he did not performed the contract's provisions properly.

4.1.7 Negotiations and purchasing contract

Nowadays, negotiation process have become an important sector in the supply chain process. According to trends, Ore Enrichment Plants seeks cost reduction and at the same time an increase in purchasing power. That means that the company needs to negotiate better rates with suppliers and at the same time maintain high quality. OEP aims at reducing supplier base and engaging into long-term agreements with the best ones.

From observations that the researcher made it can be concluded, that OEP's objective is to negotiate with few suppliers and at the same time receive low price while keeping high quality of the product and support performance. Since OEP offers an RFQ to qualified suppliers, the price of the product is never a main issue in negotiations. Crucial conditions are transportation, warranty, payment plans, technical support. Long lasting negotiations for products of significant value may lead to beneficial bids that will add serious value to the company. Company-employed purchasing professionals are always involved in negotiations and their main task is to ensure, that the company will receive the most favourable terms of purchase. Very often said employees are trained to perform negotiation tasks. The end of the proceedings concerning a commitment is to conclude a contract with a contractor.

Normally, Ore Enrichment Plants implement purchasing strategy in compliance with applicable laws, in particular the Civil Code, the Commercial Code, the Law on Unfair Competition and the Law on the Protection of Personal Data. The Civil Code - the Act of April 23, 1964 (as amended) – applies to all contracts entered by the company.

The scope of services specified in the contract makes the supplier comply with the offer on the basis of which he was chosen. The purchasing officer prepares a project of the contract and sends it for approval to the Central Purchasing Office's Contract Department. The Contract Department reviews the contract and comments on it. There is a possibility to make additional inquiries regarding the contract that clarify stipulations of the contract. The deadline for contract approval is seven days.

The most important regulations consider various rules of co-operation. One of the crucial issues is subject of agreement, volume and price. However, the price can be adjusted at the end of the quarter. Moreover, contract includes transportation conditions and Incoterms (DDP or DAP), the method of order collection, way and term of payment and invoicing. Additionally, the contract must include guarantee, laboratory examination documentation of the product with results, penalty fees, complaint issues, conflict resolution, and required attachments. Usually, attachments are in form of research methods, results of laboratory tests, etc. Contract is always bilingual, in Polish and English. Furthermore, the contract states that, in case of a dispute, the court of the hearing is the buyer's court. More to that, the contract must include who monitors the performance of the contract. The contract is signed by the Head of Logistics Department, who represents the buyer.

4.2 Reasons for strategy implementation

Here the author explains what are the main reasons for implementing current purchasing strategy (IQ2). At this point it is vital to the research outcome to point out major characteristics and justify, why they determine particular choice. Later in this thesis suggestions are given. In order to deliver valuable opinion it is important to familiarize oneself with the reasons behind implementing purchasing strategy. Deeper understanding of the problem helps to avoid mistakes and giving ideas that have been already dis-

carded by the company. Following conclusion is an outcome of author's observation based on analysis of IQ1.

What determines particular purchasing strategy is the fact of categorizing high chromium grinding media as strategic product according to purchasing portfolio matrix. There is a need for different strategy for different groups of products. For strategic products this is highly recommended to create long-term relationship with contractors. That is why OEP practices bringing the parties closer and aim at straightening relations. Over time it causes a situation in which the contractor is able to meet the company's standards and grant favourable transactions. Moreover, the company always prepares an implementation of emergency plans in case its source of supply fails. Seeking of alternatives and switching when appropriate can secure production and avoid disruptions. Purchase of strategic item places the company in a stronger position and gives it more purchase power. The goal of this strategy is to keep the position and recommend development possibilities. Maintaining current purchase power is relatively uncomplicated considering volume and value of purchased item. This situation creates opportunities for profit maximization.

One of the main elements of the purchasing strategy is the supplier selection combined with supply market research. In this Research Problem, geographical concentration in the supplier selection is not crucial. Ore Enrichment Plants are open for supply market diversity. Industry is vital in areas, where natural resources are available and there are no limitations in supplier source, as long as they have required capabilities and quality standards. As mentioned in IQ1, the preferred supplier would be the one located in European Union (EU), where community rules could be applied. The advantage of EU suppliers is rather due to the fact that in this case the additional costs will not be added to the service, the problem which arises in the supply from outside the EU, in the form of duty, customs agency, etc. Supply channels are simpler, there is no need to rent shippers due to DDP (Incoterms) contracts. In the case of contractors from outside the EU in a situation where the manufacturer is not represented in the EU, the company cannot use the DDP Incoterms, because the duty has to be paid and someone is responsible for the payment.. In this case, the only reasonable solution is to hire a for-

warder that receives the goods from the manufacturer and have him deliver them to the company's dealing with all formalities on the road. The bulk deliveries estimated at thousands of tonnes per year are a major logistical challenge to ensure timely deliveries. However, the main objective is to gain a relation with a high quality nature that is why diversity is acceptable.

More to that, the main characteristic of this industry is that it does not allow pauses in the process. Plants must work constantly, that's why OEP expects constancy of delivery. By extrapolating from that fact one can say that the company does not accept monopolies. In order to secure continuity of the delivery, and therefore production, OEP permanently seeks for alternatives and is ready to switch supplier when appropriate. Magotteaux from Belgium expressed a willingness to be the sole supplier of high chromium grinding media, but its offer was rejected. For the same reason lead time is the determining indicator in supplier evaluation.

The third issue concerns implementing the Request for Proposal in the purchasing process. Single source procurement has been used prior to the introduction of this method. RFP was an attempt to diversify the market and open new possibilities. Overall, there are little alternatives of high chromium grinding media suppliers, that is why it has been decided to benefit from all potential suppliers willing to co-operate. Moreover, it has been stated by the company, that RFP is one of the fastest tender modes available for this type of product. Also, it encourages suppliers to put the best effort in meeting requirements. RFP forces potential suppliers go be more specific and identify all areas that stay in interest of OEP. More to that, RFP is always send to at least three suppliers due to open and free competition rules. By encouraging competition the company is able to bid the most favourable terms.

Last, but not least, are quality issues. Buying the right quality of materials is one of the general objectives in purchasing. Quality of high chromium grinding media affect quality of the whole process. Quality inspection of the product takes place in order to verify, that the product represents certain characteristics determining the product to be useful in a production process. For the outcome of the process it is vital that product

has precise physical description. It is proved, that particular features of high chromium grinding media have significant impact on flotation process that is why strict control is vital. As a reminder, the product is still in test phase. In order to secure accurate results, the item must have the same characteristics each time, especially when taking into account trials lasting few years. For the same quality matter the “try and buy” method is commonly used. It allows to confirm quality by use of long-term tests.

5 Discussion

The last chapter summarizes main research findings and provides improvement suggestions to Ore Enrichment Plants. The aim of this chapter is to answer the Investigative Question 3 and also the Research Problem - how to develop a purchasing strategy for high chromium grinding media in Ore Enrichment Plants.

5.1 Key findings

Key results are easier to follow when consulting Figure 7, page 22. The graph identifies research results based on methodology. Following sub-chapters summarize findings and present their relation to theory.

5.1.1 IQ1-Current purchasing strategy

Overall, purchasing strategy for high chromium grinding media is carried out by the Department of Logistics and Sales. Due to the fact, that the product is a central buy, all purchasing activities are monitored and controlled by Central Purchasing Office. According to Kraljic's product portfolio high chromium grinding media are considered a *critical/strategic product*. The company claims that the product will have high impact on profitability and productivity by significantly improving the production process.

The purchasing process of high chromium grinding media consists of several steps, that are similar to those introduced in theory in Chapter 2. However, one extra step of supplier pre-qualification is included. Procedure is started by specification of the product and its followed by Request for Information, Request for Proposal and Request for Question, if applicable. Moreover, these steps are followed by Agreement and Purchase Order. Purchasing process ends supplier evaluation.

More to that, Ore Enrichment Plants find it important to manage quality in purchasing process. Everybody in the organization is involved in quality control in order to ensure high quality. That involves the Management Board, Management of Departments and workforce. Total Quality Management described in theory framework applies to prac-

tice and it is implemented by management in the case company. Additionally, Ore Enrichment Plants seek those sources of supply that can deliver item with 14% or higher chromium content. More to that, product specification should include certain hardness, shape, structure and heat treatment. All of the above must be proven by detailed documentation of laboratory tests and results.

Another finding is that the Department of Logistics and Sales is the one responsible for assessment of suppliers' qualifications. The main criteria for supplier selection are: lead time, price, quality, technology, reputation, references and more. Selection and evaluation criteria are built according to rules presented in theory section 2.4. OEP provides two evaluation methods: ratio analysis and Delphi analysis.

A Supplier granted with the contract will find several conditions stated: subject of agreement, volume and price. Moreover, contract includes transportation conditions and Incoterms (DDP or DAP), the method of order collection, way and term of payment and invoicing. In addition, the contract must include guarantee, laboratory examination documentation of the product with results, penalty fees, complaint, conflict resolution, and required attachments.

It is worth mentioning that all purchasing activities are carried out with strong consideration of ethical standards. The goal is to maintain good reputation of the whole company and engage into long and lasting relations with suppliers and partners.

5.1.2 IQ2-Purchasing strategy implementation

There are several strategy characteristics that are reasons why this particular strategy is more effective than the other ones. Problem research shows, that the current purchasing strategy is determined by nature of the product. High chromium grinding media is a central buy and additionally a strategic item according to the purchase portfolio matrix. Considering the industry's nature it is crucial to secure timeliness of delivery. As a result, the company all the time searches for supplier alternatives and does not accept monopolies.

The most vital element of the strategy is its use of Request for Proposal in the purchasing process. This method opens possibilities for co-operation and it claims to be the fastest tender procedure so far. Last important finding considers quality control. As quality of the product impacts quality of the whole process it is a major issue to investigate physical description at the product arrival.

5.2 Development suggestions

This subchapter aims at answering IQ3 - what improvement suggestions can be given to Ore Enrichment Plants and also partially a Research Problem. Enhancement suggestions are given based on the conducted research and theory framework. The development proposal is based on the researcher's observations and personal judgement.

The important thing that the author would like to give before further suggestions is a short evaluation of the current purchasing strategy. The biggest positive aspect of the strategy is its transparency. Strategy comes out as very clear, specific and thought through well. The most important fact is that the strategy is understandable for both employees and potential business partners. The company highly values transparency, this is why general resolutions are available online on its official website. Thanks to that every potential business partner can familiarize themselves with the strategy and decide whether they want to engage into any relations. The current purchasing strategy has all features of a world class purchasing strategy and is positively evaluated by international industry professionals. Strategy includes thorough description of general rules, a list of persons responsible for strategy execution and what are most important ways of strategy implementations. The problem that deserves a distinction is ethical issues. Thanks to a strict approach it is easier to eliminate dishonest actions and prevent bribery. More to that, the company has perfectly worked-out supplier selection and evaluation, with clear steps, precise choice criteria and rigid quality standards. The current purchasing strategy is supported with excellent legal regulations and negotiations procedures. Furthermore, the case company receives a very good IT support with its ERP system and IT solutions that help with handling processing paper work inside the company, purchase orders and tender procedures.

The overall evaluation of purchasing strategy is positive, however the researcher wants to point out a few aspects that could be taken into consideration by case company. First of all, the author suggests to implement some changes in the purchasing process itself. According to Polish Public Procurement Law, there are several possibilities to award a contract to a supplier. Taking that into consideration, the author suggests using a support mode for Request for Proposal, which is an electronic auction. The electronic auction may be the final course of action (extra time, balancing phase) to the main tender procedure. This mode consists of submitting a new, more favourable offer by using the form found on the company's official website. In this proceeding suppliers may make increments, up to the point where one of them raises an offer that will not be "topped" by any other participant. Offers are automatically classified by a computer through direct connection to the company. The output parameter of the auction is the price and the point value of other criteria being of high interest to the company. Point classification is based on the offers submitted previously. The purpose of the electronic auction is to select the best offer for the company. The use of this mode provides greater benefit to the Ore Enrichment Plants. The goal of implementing the electronic auction is to maximise benefits coming from stronger purchase power. Moreover, the possibility of an electronic auction will contribute to the promotion of the use of IT solutions in public procurement procedures.

Also, vital for the strategy is the fact of acquisition of mines in Canada, that have the same high chromium media supplier. It means, that if the product's quality is confirmed, the strategy will be unified and that includes purchasing process, pricing methods etc. Therefore, suggestions also relate to the aforementioned acquisition activity. Name of the company in Canada has changed to KGHM International, but according to the author's findings there are significant problems with strategy unification. As it happens, Canadian procedures are not up to date which causes discrepancies in standards. The goal of KGHM Polska Miedź S.A should be the creation of a common purchasing strategy. The biggest challenge is to unify indexes which identify materials. All indexes are listed in Polish Classification of Goods and Services and consist of marked groups of materials with letter groups for particular products. Consolidating indexes might be time consuming and in some cases impossible due to the amount

(about 30.000 indexes for Ore Enrichment Plants) and local laws, however it is crucial to make the attempt in merging strategies. Unification can ease control of performances in Canada, according to the rule: “trust, but supervise”.

Last, but not least, the author recommends improving supplier database with a focus on the suppliers’ blacklist. In accordance to findings it is stated that the Central Register of Entrepreneurs is a rather difficult application and is not used very often. The company claims that relevant application is not a major need, as there is not a huge range of suppliers and it is easy to remember which one carried out the contract properly. However, designing a comprehensible database can save time in the future, when a supplier that was not awarded a contract previously submits an offer once more. Taking into account long-term contracts, often lasting 3-5 years, it may become more important to realize the value of various suppliers. Having solid database may be useful when it comes to supplier selection process starting all over from scratch. Its support could be in the form of a more developed use of the ERP SAP system, which at the moment serves as a “data warehouse”. First of all in ERP SAP are recorded events occurring in the company. Additionally, SAP allows the execution of a particular group of reports, but also is used for scheduling. It is based on the unit referred to as data warehouse. However, there is no use of SAP for production planning. Production Planning (PP) module is implemented residually and is in fact in the register of the production capacity. The other modules are implemented fairly widely. More to that, the author suggests putting in the suppliers’ blacklist into use. The company allows the creation of blacklists, however potential of this possibility is not yet explored enough. The use of a blacklist would help to in eliminating suppliers, who in the past did not carry out contracts correctly from the tender procedure.

5.3 Suggestions for future research

This completed research was limited to purchasing process and all activities related to purchasing activities, such as supplier selection, the purchasing contract and evaluation. The researcher omitted issues of product demand, as this point was already investigated by the case company and confirmed with suitable laboratory and technology tests. Here, the author gives suggestions how purchasing strategy for high chromium

grinding media can be developed in future, and by that, fully answers Research Problem. At current stage, when high chromium grinding media are still in test phase it is difficult to predict what would be the best alternative for future research. At the moment several indicators are under the investigation, such as the wear & tear indicator and comparison with iron and low chromium grinding media. The purpose of these tests is to establish if there is a real demand for a permanent addition of the product to the company's purchasing strategy. The tests are not likely to end by the end of the year 2013.

However, implementation of the most suitable purchasing strategy will require a reviewing of the current one. Developing a purchasing strategy should start with assessing the current one. Objects of the assessment should be: chosen suppliers, trends in the market, technology and capabilities, involvement from the company's side, effectiveness towards the goal. An assessment of the situation should be followed by a strategic gap analysis and setting new or added objectives. An updated strategy can be supported by suitable tools as benchmarking, SWOT analysis, risk assessment and personal experience in the field. In a typical situation, a strategy should be composed in written form with a clear plan of implementation that is approved by the Management Board.

One of the most important matters is to maintain quality of purchasing strategy, as it reflects quality of the whole company thanks to corporate and purchasing strategy alignment. It is important to remember that the organization's reputation is based mainly on two factors: quality and innovation. Therefore, a purchasing strategy must fulfil these criteria as well. A lot of attention should be given to quality control every time an order is delivered. Following that, quality can be maintained by commitment of purchasing officers whose competences in supply chain should indicate world-class supply strategists. Taking into account that high chromium grinding media are strategic for the organization, purchasing officers should be trained in relationship management skills, cross-functional working and product specification. They should possess good communication, strategic thinking and risk assessment skills.

For further research, the author suggests to focus on quality improvement methods that could be implemented by suppliers or even the case company. Strong involvement into quality will help to maintain the company's standards and the way it is perceived worldwide. Among the suggested improvement methods there are some, that could be a big asset in terms of supplier selection criteria. As mentioned before ISO standards are not required to participate in the selection process, however, they are an asset. Similar rule can be applied for other quality improvement methods created mostly for manufacturing purpose. As an example, the author wants to bring up Six Sigma that is often compared to TQM implemented by the case company. Snee (1999, in Jiju 2004, 303) explains that "six sigma is a business strategy that seeks to identify and eliminate causes of errors or defects or failures in business processes by focusing on outputs that are critical to customers". Six Sigma uses statistical methods to eliminate defects that usually lead to customer dissatisfaction. The main objective is to create measurement-based strategy where the main goal would be process improvement. A six sigma process claims that 99.999998% of the products manufactured are defect free, what gives only 0.002 defective parts per million parts produced. (Jiju 2004, 303.) In relation to the above, the author suggests further investigation of the Six Sigma concept and implementing it as supplier selection criteria. Accordingly, other improvement methods can be used, such as lean manufacturing and others.

In accordance to the fact that the case company implemented the TQM method, the author wants to point out that in literature Six Sigma and TQM very often compete with each other. It may bring some thoughts of implementing Six Sigma or use it as an alternative to TQM. However, it is important to remember that TQM executes long-term process aiming at never-ending improvement and involves every single person in the organization, while Six Sigma is more result-oriented. More to that, it would be rather hard to implement Six Sigma in the purchasing department, where the process appears to be intangible. Due to the non-physical character of purchasing performances it would be difficult to define or measure any of Six Sigma levels. Nevertheless:

this methodology should include process delineation, index measurement generation, data collection for quantifying the process, a structured gap-minimization strategy for performing statistical analysis (most likely, using nonparametric statistics) and to demonstrate significant improvement toward Six Sigma. (Perez-Wilson 1997, 2.)

In the end, it is vital to underline, that Six Sigma is predicted to become more popular and it has a bigger potential to achieve in comparison to TQM (Jacowski, 2008).

5.4 Methodological review of the research

In this section the researcher reminds the readers what research tools were used and also evaluates their validity and reliability. The research tools that were used include interviews, workshops, phone calls, e-mails exchange, analysis of documents and observations. For visualization of tools used, please consult Figure 7, page 22. The whole research was based on theoretical studies of books and journals that helped to understand what issues should be tackled during the interviews. Overall, the research was conducted as presented in theory (section 3.1). Data collection, analysis and applying theory into practice were happening simultaneously.

Reliability and validity

In author's opinion all interviews and workshops were successful in terms of quality and relevance to the problem. All information received were highly valuable and professionally delivered. Additionally, secondary research was fully gratifying. Materials received from the company were complete, detailed and added important information to research results. In addition, the researcher was given enough time to familiarize with all documents. That allowed a thorough analysis and further observation based on comparison to theory framework. Moreover, other secondary data such as books and journals were good of quality, gathered with support from HAAGA-HELIA University of Applied Sciences library.

The company's representative was highly motivated and involved in the thesis writing process and always helpful and available to serve a help. In unstructured interviews author received detailed information supplemented with examples. Discussions were never rushed, they were very precise and very specific. Moreover, all issues mentioned in research limitation (section 1.3) have been investigated in details and answered with full relevance to the Research Problem.

5.5 KGHM Polska Miedź S.A comments and feedback

“While writing her Bachelor’s Thesis Justyna Mäkilä was dealing with issues connected with planning purchasing strategies based upon chromium cast iron media assortment group, which constitutes a significant position in KGHM Polska Miedź S.A. in terms of securing production and purchase price.

The student has had an opportunity to face the real subject, which is currently being executed by one of the world’s largest producers of copper. New challenges connected with increasing the efficiency of production and logistic processes, but also new perspectives related to KGHM’s expansion make including all of these elements in sourcing developed for particular assortment groups a necessity. KGHM has high hopes for chromium cast iron grinding media in terms of enhancing the effectiveness of grinding and flotation processes, which is to translate into a definite financial result. The choice of right suppliers who guarantee a product of the highest quality, conclusion of properly defined contracts securing the interests of the copper company, designing and running supply chains are elements that must be managed strategically.

Justyna has approached the analysis of the issue in a methodical way and tried to make her thesis include all of the elements necessary for developing a good sourcing. She created a plan thanks to which she was capable of determining the information and tools needed for designing a good strategy, which was necessary for carrying out the main goal. The adopted research method proved to be justifiable and has provided a good basis for research and, following that, drawing conclusions. The solutions suggested in the latter part of the thesis (especially those regarding demand aggregation in a corporate group and conducting joint proceedings) are reflected in actions that are currently being undertaken by KGHM PM S.A. Justyna exhibited high levels of acumen and attention to details while collecting materials. While writing her thesis she would confirm source data collected during an interview, a practice that, according to my judgment, is a very good method of avoiding substantive errors which would have a significant impact on conclusions.

Throughout the consulting period I have noticed a significant progress in terms of Justyna's familiarity with concepts connected with logistics and strategic sourcing in purchases. I am certain, that she has acquired skills in the field of logistics and purchases, which constitute a basis in terms of commencing work in the aforementioned field. "

Polkowice, 21.10.2013

Sebastian Milnikiel, Logistics Main Specialist – Logistics & Sales Manager,
KGHM Polska Miedź S.A

5.6 Personal learning process and outcome

Writing this bachelor thesis has been one of the most interesting challenges during my studies at HAAGA-HELIA University of Applied Sciences. The goal of the research was to present purchasing strategy for high chromium grinding media in KGHM Polska Miedź S.A, Ore Enrichment Plants and suggest development ideas. This experience gave me a valuable lesson, as I had an opportunity to manage the project myself and evaluate my own skills.

Before conducting the research I read a variety of books and some articles regarding purchasing strategies that gave me a chance for deeper understanding of the phenomenon. I had a chance to familiarise myself with views and concepts that were not a part of my specialization studies. Moreover, combining business purchasing strategy with mine engineering was a real challenge. Without understanding production process and product specification it would be difficult to provide valuable research results and suggestions.

Last, but not least, during my thesis writing process I had the pleasure to meet purchasing professionals at an organization that is highly valued in the environment and has significant impact on the country's economy.

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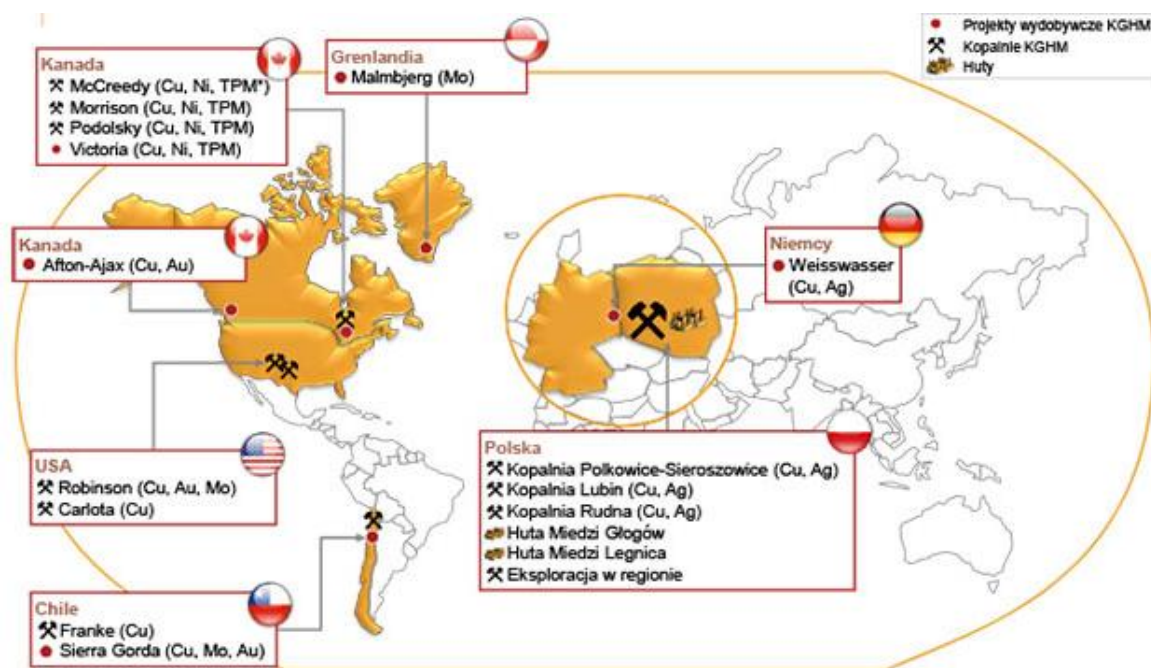
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Attachments

Attachment 1. Picture of high chromium grinding media.



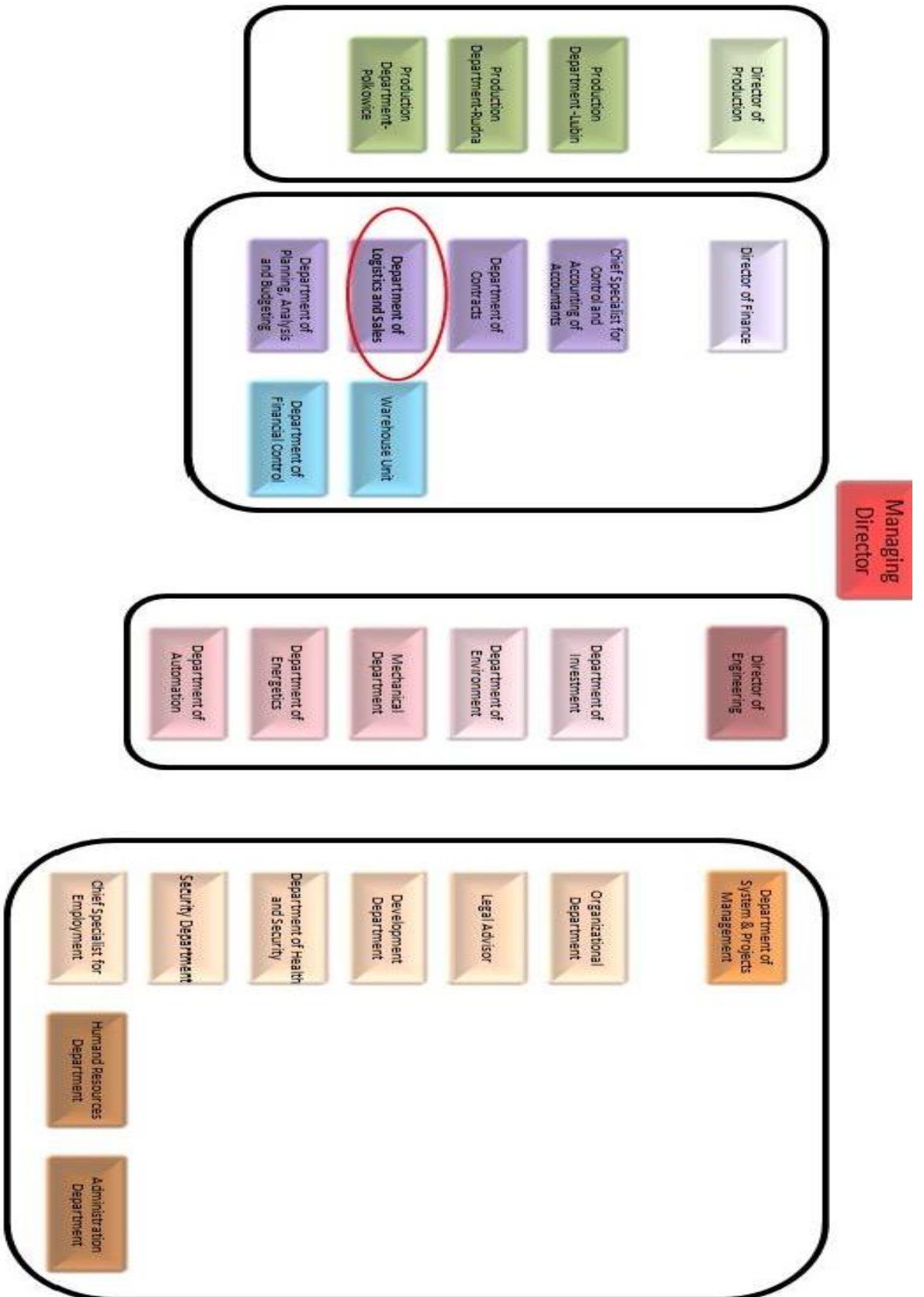
Attachment 2. KGHM Polska Miedź S.A. map of international activity



Translation for the legend:

- Projekty wydobywcze KGHM (KGHM mining projects)
- Kopalnie KGHM (KGHM Mines)
- Huty (Smelters)

Attachment 3. Ore Enrichment Plants organizational structure

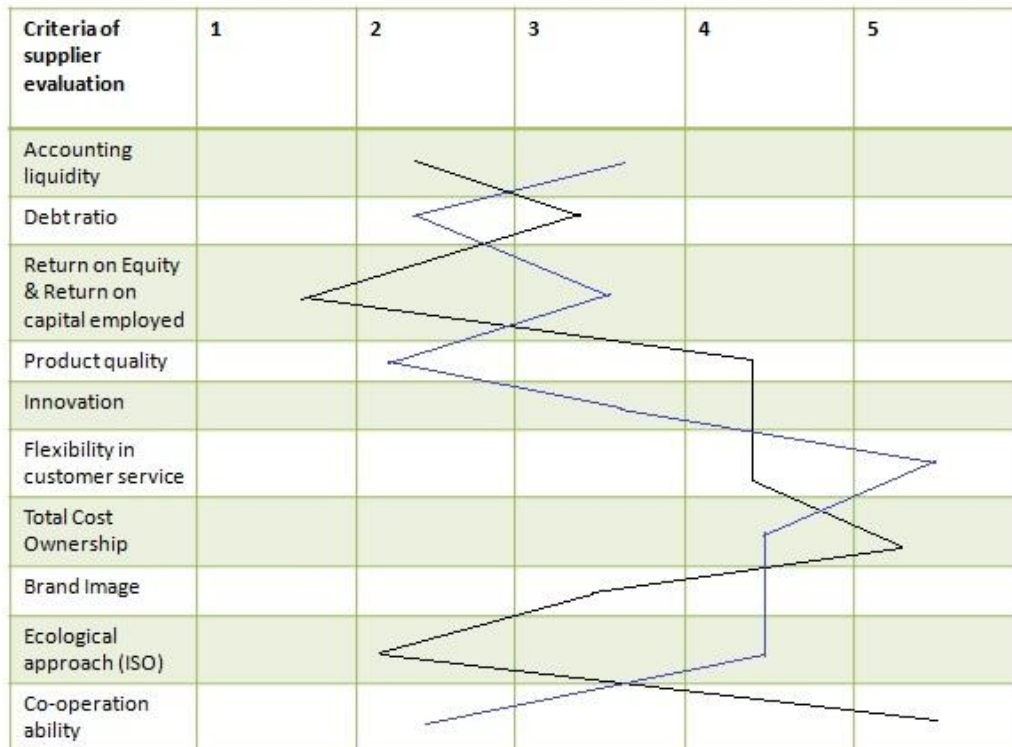


Attachment 4. Supplier evaluation forms

Delphi analysis

Criteria of supplier evaluation	Weight	Supplier 1		Supplier 2		Supplier 3	
		Points 1-5	Weighted Mean	Points 1-5	Weighted Mean	Points 1-5	Weighted Mean
Accounting liquidity							
Debt ratio							
Return on Equity & Return on capital employed							
Product quality							
Innovation							
Flexibility in customer service							
Total Cost Ownership							
Brand Image							
Ecological approach (ISO)							
TOTAL							

Ratio analysis



Supplier 1

Supplier 2

Attachment 5. Overlay Matrix

Investigative questions	Theory framework	Measurement questions & tools	Discussion
<ul style="list-style-type: none"> • What is current purchasing for high chromium grinding media? 	<ul style="list-style-type: none"> • 2 	<ul style="list-style-type: none"> • Interviews, workshops, secondary data analysis 	<ul style="list-style-type: none"> • 4.1
<ul style="list-style-type: none"> • Why current strategy is implemented? 	<ul style="list-style-type: none"> • 2.2, 2.3, 2.4 	<ul style="list-style-type: none"> • Interview and observation 	<ul style="list-style-type: none"> • 4.2
<ul style="list-style-type: none"> • What improvement suggestions can be given to OEP? 	<ul style="list-style-type: none"> • 2.3, 2.4 	<ul style="list-style-type: none"> • Observation 	<ul style="list-style-type: none"> • 5.2