

IDENTIFYING AND REMOVING BARRIERS TO INNOVATION IN BI GROUP

(Capstone Project)

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Abstract

To succeed in today's fast changing world, companies specifically operating in a high knowledge-intensive industries must continuously innovate and improve. In this regard, firms worldwide are quickly raising their awareness of the significance of the role of knowledge management (KM) in the innovation process. Many successful companies have already achieved excellent results in the KM implementation, and thus have learnt how to bring innovation to their organizations. However, there is no universal approach to KM, and obviously any company first has to start with the exploring the obstacles to innovation. Therefore, the purpose of our study is to identify the major barriers to innovation in BI Group construction company, as identified in the literature, and to compare and contrast them with the ones that emerged from the sampling of employees' opinions. The focus of the research is knowledge creation, capturing, dissemination and its use within the company. Several frameworks to externalize tacit knowledge, existing knowledge management models, and strategies are carefully studied and presented in the literature review. As a result, special KM cycle for BI Group is designed and thoroughly explained. It involves seven stages – Event, Capturing, Coding, Validation, Sharing, Accepting, and Usage. The methodology of the research also included online survey which was conducted among BI Group company's employees. It aimed to identify employees' opinion about KM and its current stage of development in the company. The results of it can be found in the Major findings and suggestions to BI Group section. The study is significant for the development of KM in BI Group company. The results bring practical value and outcomes can be systematically applied in practice.

The following table demonstrates which part was implemented by each team member:

1. Introduction	Ainur Akhmetova
2. Obstacles to innovation	Ainur Akhmetova
3. Literature review	Ainur Akhmetova
4. Best practices	Ainur Akhmetova
5. Methodology	Assiya Khassenova
6. Analysis	Assiya Khassenova
7. Major findings and suggestions to BI Group	Assiya Khassenova
8. Conclusions and further study	Assiya Khassenova

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1. Introduction

The invention of a new idea is exciting but it only becomes important when it can be actually brought to the market. Innovation is the process through which new ideas lead to the creation of a new product, process or service. Innovation involves creative thinking to generate new value and to bring about significant changes in society. Innovation is important to organizations because it allows them to find competitive advantages in the marketplace.

Today we are clearly in the middle of an innovation bubble. Everyone is in favor of innovation. Companies, organizations and governments claim to be fostering and promoting innovation, in an attempt to make themselves appear to be modern, while their actions are not consistent with their words.

Innovation is of course difficult and liable to fail. Lack of leadership, inadequate infrastructure, property rights and many others can get in the way of great ideas. The study of the barriers to innovation has identified five key areas as the most formidable obstacles to innovation (IBM 2006):

1. Inadequate funding

Start-up funds can help innovators move their ideas along. Getting the seed money for an innovation to survive however often means taking money away from an established program.

2. Risk avoidance

No progress is made without calculated risk taking. Innovation can be nurtured rather than killed in an environment that balances realistically risks against benefits. But since organizations know that innovation is risky, they often run away from it by constantly finding the things that could go wrong.

3. Silo mentality

Organizations create boundaries between departments (silos), assign responsibilities and put rules in place. By nature, innovations tend to cross boundaries leading to natural internal organizational conflicts. As a result, often innovations that might benefit the whole enterprise are killed by departmental units that do not benefit themselves.

4. Time commitments

Time is a scarce and precious commodity for organizations as it is directly related to productivity. While time spent on innovation is essential for success, it is difficult to prove that such an investment would pay off in a timely way or at all. Many organizations restrict employee time spent on new ideas thus handicapping the timely appearance of innovations in the market.

5. Incorrect measurements

For many organizations, revenue, profits and market share are the only measurements used to identify success. These are easier to quantify than intangibles such as reputation, intellectual capital, market leadership etc. that make major contributions to the true value of an enterprise. Most innovations that matter are difficult to explain in terms of return on investment.

This is not of course the full set of barriers innovations can face; indeed, the five obstacles above are not necessarily universal or complete. The creativity of a specific organization may face obstacles that are different and perhaps more specific.

In this context, the objective of this project was to identify the major barriers to innovation in BI Group construction company, as identified in the literature, and to compare and contrast them with the ones that emerged from the sampling of employees' opinions. The focus of our project is the BI Group, a leader of the construction sector in Kazakhstan. After two decades of successful operation, the company has earned a high reputation as a

reliable partner that implements the construction of residential and commercial real estate, industrial, civil, transport and social infrastructure.

Although top- and senior-level management at the BI Group constantly emphasize the urgency and significance of innovation and put a lot of effort into establishing related business processes within the company, people are inactive, and the acceptance of new initiatives by employees leaves much to be desired. During an initial formative meeting and interview with the leadership of the group, the following barriers were recorded:

- Even if some employees support innovation, there is an issue of “reinventing the wheel”. Since the group consists of three big holding companies with multiple divisions in each holding, employees are often unaware of each other’s improvements and activities. They might invent new practical approaches without being aware that these particular approaches are already used in different parts of the organization. Thus, the employees might spend huge amount of time and effort in vain.
- Employees are not very motivated to accept new ideas. This embraces management questions of how to effectively communicate good ideas in order to make people get interested in them. Precisely, there is the issue related to getting people familiarized with new information. New approaches and ideas are distributed in the company through various network and social media channels, but it appears that employees simply do not read these messages for different reasons.

After the initial interview with the leadership of the BI Group, we were authorized to develop and distribute a questionnaire to all the employees of the company. The objective of the questionnaire was to identify the barriers to innovation as perceived by the workforce of the company and to identify similarities and differences with the perceptions of the management of the company as well as with the literature on the subject.

This capstone report is organized as follows. In Section 2, we discuss the issue of barriers to innovation, in section 3 we provide an extensive literature review on the knowledge management topic. In Section 4, we provide the best practices of international companies; in Section 5 we provide the rationale for the development of our questionnaire and the logic behind our choice of questions. In Section 6, we present the statistical analysis of our results by focusing on the efficacy of our obtained sample and on the identification of major trends. In Section 7, we discuss our findings regarding innovation barriers for the BI group and provide suggestions for the company. Finally, in Section 8, we summarize our conclusions and recommend actions for further study.

2. Obstacles to innovation

2.1. Inadequate funding

According to Sotirova (2016), one of the serious factors negatively affecting innovation performance of industrial enterprises in Bulgaria is the lack of financial means (Sotirova, 2016). Due to the absence of funding, many Bulgarian enterprises operate producing “products of a low technological level.” Sotirova (2016) found out that the huge problem lies in the “shady” state policies regarding innovations. Specifically, there are no clear-cut policies which would outline financial and tax incentives or reliefs to encourage innovation and research. Mohnen et al. (2008) recognize the importance of policies as the significant instruments to let private equity contribute to innovations. Many firms will be able to access additional financing easily without long phases of various procedures. As the authors claim, venture capital and other forms of investments have become major sources of financing which cannot be neglected, therefore, should be given special legal regulations.

Similar issue can be observed in the Russian Federation. A high level of bureaucracy prevents in getting grants for innovative projects. The need to justify every expenditure in front of the government makes it difficult for the inventor to proceed with the innovation (Butryumova et al., 2015). Venture capital for the initial stage is absent. Investors prefer to

fund low risky projects with a shorter payback period and lower investment. But, there is a tendency for private investors to fund projects that have already attracted state subsidy (Butryumova et al., 2015). Probably due to the risk averse culture in India there is a shortage of seed funds at the beginning stages of the development of the company. Seed funds are available only for later stages of the development. Small enterprises (especially if they are in countryside) have less chances to get funding compared to mature companies that demonstrate better growth potential (Siddiqui and Jan, 2014).

Developing innovation via providing an access to financial sources is still an issue across OECD (OECD, n.d.). The issue involves broadening the access to public and private sources of finance for innovative projects. Recent economic downturn and the focus on short term projects are significant obstacles in this case. High interests of banking system do not help to sort out the situation at all. In contrast, the desire to invest vanishes because nobody wishes to risk so much. Therefore, governments' support is viewed as crucial aspect.

According to OECD (n.d.), new institutional approaches are necessary to start state funds. Moreover, the governments can create conditions for small financing via the Internet. Different stakeholders from all over the world may become interested in investing in small short term businesses. Crowd funding has become popular in the USA while Portugal initiated tax benefit law. Russian Federation substantially increased direct funding whereas Austria and Slovenia are observed to provide largest governmental support. As the studies indicated, the mix of direct and indirect funding has increased. These measures are unavoidable independently if they are permanent or temporary.

2.2. Risk avoidance

It is believed that large companies which invest much in R&D are not so good at innovation as small start-ups are which more often demonstrate an outstanding performance in this issue. There are such examples of this phenomena as an instant photography that was brought to market by fledgling Polaroid, and not by large Kodak; the introduction of

new type of package delivery “overnight service” by new start-up Federal Express, even though larger companies had more resources to make such a shift, etc. (McIntyre, 1982).

Risk avoidance is one of the major obstacles that large companies tackle when trying to innovate. According to Simonelli (2014), there are five factors that could be used in company’s risk resistance identification. They are company’s size, age, structure, clients, and market.

The bigger and older the company is, the more it resists risk. Since large corporations are well-established structures that keep and manage the past successes, they usually operate according to written procedures that were designed to reach efficiency. These kinds of firms operate according to established formal mechanisms that were developed to determine and avoid risks. Hence, innovation destroys the usual stable state of employees, and as a result faces the resistance to change and accept certain risks (McIntyre, 1982).

The company’s hierarchy produces conservative employees. The chief-subordinate relationship may generate conservatism. Subordinates avoid taking risk since they do not want create problems for their bosses in case of failure. Also, they believe that chiefs are tend to remember the negative experiences of their subordinates rather than positive ones. Moreover, when chief and subordinate have very low contact due to organizational hierarchy, the negative outcome of risk taking by subordinate may be exaggerated in the eyes of boss. Experience has shown that innovative people are less promoted and honored in large companies than their conservative colleagues. Thus, big corporations are mostly staffed with conservative employees (McIntyre, 1982).

Large companies fear from the risk they might bear by investing in a certain innovation project in relation to the uncertain ROI. They do not want to lose market share and resources that were already allocated to the current product since innovation may cause a threat to existing successes. Therefore, big corporations do not usually innovate in areas where they have already achieved excellent results and won market share (McIntyre, 1982).

To overcome risk avoidance obstacle, it is better for large innovative corporations to learn how assess risks in a more effective way, as well as to accept failures and even give second and third chances for the potential inventors to try again. According to International monetary fund (2013) fifty percent of the hundred thousand US new companies that were established in one year period fail (Siddiqui and Jan, 2014), nevertheless people there still strive to bring their innovative ideas to life. Thus, we can safely say that one of the reasons for an American economic prosperity is the fact that in the US a failure is regarded as an initial step for better success in life.

2.3. Silo mentality

According to the business dictionary silo mentality is a situation when certain departments within one organization do not want to share information with each other. This leads to many negative outcomes such as decreased efficiency of the whole company's operation, a lack of collaboration and joint innovation, decreased morale and wasteful conflicts. The internal competition between certain business units can result in misunderstanding when working with outside vendors since the organization operates not as a single unit, but as runs of segmented and unorganized departments. This is especially attributed to large companies which separated their departments due to belief that special focus of each department would increase productivity. In reality, the separation makes coordination inflexible and leads to conservative moves. Thus, the company undermines its reputation and experiences financial losses due to constraints on innovation, missing deadlines and other failures.

To overcome silo mentality Willcock (2014) proposes "inside-out" approach which is based on Relationship Review Framework. This approach involves consideration of three levels – individual, team and organizational levels.

People naturally prefer to work in isolation since it gives them the sense of control over their own work. It has become difficult to deal with the differences between members of a

team in such uncertain business environment, although these differences could be conducive to creativity and subsequent innovation in the organization.

People have different personalities, character traits, views, and preferences; it's not surprising that they prefer to conduct an individual work. However, it should be taken into account that individual's performance can significantly affect the operation of the whole company. There is often a huge responsibility which lies on each individual's shoulder though it might not be seen from the first glance. Therefore, the cooperation including compromises is unavoidable to let the progress happen. Willcock (2014) suggests helping employees start with themselves first. It is much harder to influence other peoples' beliefs and habits rather than yourselves. The employees have to "develop emotional intelligence, change perspectives, and increase behavioral choices" (Willcock, 2014).

Again, in order to increase the productivity of the work, the warm relationships should be established. This, however, cannot be accomplished by individual level only. According to Willcock (2014), there is a team level which bears a high importance in both generating and overcoming silo mentality. Silo mentality can be caused by a couple of challenges. First, it is a loss of identification with a team. In this case, an employee starts losing sense of loyalty to what he/she does. Second, it is too much identification. This may result in a lack of cooperation with other business units decreasing functional performance. Willcock (2014) provides his views on what efficient team should look like to avoid silo mentality. He calls that team as "the open team" which has the characteristics of being collaborative, flexible, and passionate at the same time.

Finally, the issues causing silo mentality in individual and team levels are similar to those in organizational level. The quality of cooperation within teams reflects on the quality of cooperation among teams. To have strong partnership and good relationship externally, an organization should be open, adaptable, and flexible. Willcock (2014) argues that organizational culture is no more about "top-down" approach which may not be really

helpful to change the culture. Instead he offers “inside out” approach which begins with an individual, then team and finally affecting organizational culture.

2.4. Time commitments

Any innovation takes time. However, some people believe that time dedicated to creative imagination is not time dedicated to working. As Burton Rascoe, an American journalist, once said: “What no wife of a writer understands is that a writer is working when he's staring out the window” (Wilson, 2015). This works for everyone who is involved in developing innovation. To solve a certain problem employees should take some time to reflect on that problem. Those who are only occupied with their work usually are not able to innovate. According to the research conducted by Teresa Amabile from Harvard Business School creative thinking decreases when employees constantly experience stress and pressure at work, and routine operational work does not allow innovation to prosper (Reis, 2014).

Therefore, to come up with creative business ideas employees should be given free time to innovate. One of the good examples of such approach was Google’s twenty percent of working time dedicated to innovative projects. This policy later resulted in the emergence of Gmail, Google Talk, etc. By encouraging its employees to work on what they consider will be more advantageous for Google, the founders empowered people to think outside of the box and be more innovative. Then, as the corporation grew, starting from 2011 Google introduced more specific innovation strategy with the “top down” approach to choosing focus areas of innovation (Ross, 2015).

Another issue related to time with regard to innovation is the fact that return from innovation usually requires time commitment that is minimum five years or even more (McIntyre, 1982). This is too long time since large corporations tend to measure short-term results (once in a year) using financial metrics such as profit and ROI. According to Innovation survey that was conducted by Henley Management School in 2007, “old” European union member countries (mainly UK, Germany, Sweden, etc.) specify “too long

development times” as the greatest barrier to innovation (Elenurm and Oper, 2008). Lack of long-run perspective is found to be the one of the major problems tackled by Bulgarian industrial enterprises with regard to innovation development (Sotirova, 2016).

Therefore, it is vital to realize the significance of time when dealing with innovation and creativity. Instead of concentrating on short term wins with a sustainable ROI, it is better to create a system that will allow the company to succeed in a long perspective.

2.5. Incorrect measurements

Traditional ways of measuring innovation is frequently misleading and distort reality causing much trouble. Measuring innovation has always been a challenging task for all large corporations. There are some metrics which overestimate the capacity of innovation while others may underestimate it. For instance, calculating revenue obtained through the certain project may not take into consideration some invisible business values of certain ideas the project imply (Deloitteeditor, 2012).

Phillips (n.d.) outlines several challenges which often occur when evaluation of innovation takes place. One of them is about the businesses being so focused on return on investment. It is no secret that most of the firms would simply desire fast and safe return of investments. Therefore, there is usually no assessment of projects as such, it is merely about measuring predictable projects. Noteworthy, big return is like a gamble but if the idea is right, the profits are big.

Manoochehri (2010) claims that using single metric is not enough. It is important to apply a variety of measuring activities to avoid misleading outcomes. Innovation dashboard is successfully used by many companies. The dashboard is a set of metrics which assists in monitoring company’s performance in the sphere of innovations. Manoochehri (2010) argues that there is a recommended number of metrics – from eight to twelve. Too many metrics may lead to incomprehensiveness of measurements. Therefore, a few critical metrics should be decided on before the list can be expanded further.

Manoochehri (2010) considers three metrics – Input metrics, Process metrics, and Output metrics. Input metrics involves two crucial inputs such as allocation of budget and assignment of key responsible people. While the abundance of budget does not guarantee the success of the innovation, the lack of it will surely lead to the innovation's failure. Financial support is important at any stage of innovative project. Highly educated and skilled staff is something else which is necessary for the success. More dedicated people who can spend extra time on the projects are crucial to have.

Process metrics includes four aspects of innovation process such as managing time, managing innovation pipeline, new projects' performance projection, and staffing against plan. Time is a critical factor to consider before launching a project. Meeting various deadlines is always a challenge. Not following the schedule of project development may cost dominance at the market and profitability. Another critical aspect is managing innovation pipeline which implies generating new ideas and moving them via different phases of the project. Close attention should be paid to this aspect because it is what the projects starts from. Performance projection is the third aspect of the innovation process which focuses on whether the projects met the expected outcomes. Finally, staffing against plan implicates continuous monitoring if there is enough staff to complete the project. Otherwise, delays are inescapable.

The last metrics, Output metrics, focuses on revenue generated by innovation projects. It includes the following indicators: proportion of revenue obtained from new products; proportion of profit obtained from new products; proportion of revenue growth obtained from new products (Manoochehri, 2010).

These indicators are significant because measuring the revenue and profit of a certain project is the ultimate goal. However, the presence of the indicators does not mean that it is easy to evaluate. There are some ambiguous factors as: What is new? How new should it

be? How long is it new? Etc. So, measuring innovation is a complex procedure which requires a systematic approach and professional knowledge.

3. Literature review

The literature review starts with a brief introduction to Knowledge Management (KM). Then some important terms and concepts in the field of KM are discussed. In addition, one of the models of KM process is borrowed and explained in detail. Noteworthy, we designed our own cycle of KM based on the model. It was necessary because the cycle we designed provides quite detailed and clear flow of knowledge. It also can easily be adapted to any construction company including BI Group company. Each of the stages of the cycle is carefully analyzed, however, the most problematic stages for the company as packaging the knowledge and sharing the knowledge are considered in more detail. The former problem is connected to ensuring if employees learn the knowledge the management tries to transfer them. This is connected to the way how one communicates ideas. The latter problem is about lack of knowledge flow which can lead to “reinventing the wheel”. By “reinventing the wheel” we imply inventing the same techniques and approaches to do a certain work which are already applied in a different part of the same organization. Noteworthy, the literature is more about sharing knowledge rather than the issue of “reinventing the wheel”.

With the advent of the third era of globalization, Knowledge Management (KM) in the context of organization has become one of the hottest topics in the world. In the past, KM was a part of Information Systems Management, however recently it has been considered as a new emerging separate discipline within Organizational Management.

In recent years, there is a tendency in strategic management of transition from market-based approach to resource-based one (Milner, 2003). Therefore, to sustain competitive advantage in today’s fast changing world, companies should quickly adapt and learn how to effectively manage their most valuable strategic asset – intellectual capital (Yusof et al., 2012). Many researchers claim that in future KM must become an integral part of the

organization's overall strategy. Thus, KM strategy should be aligned with the business strategy.

There are multiple of definitions of knowledge in the academic literature. The definition of knowledge by Pearlson and Saunders (2012) is found to be the most suitable for research purposes of the capstone project. According to the scholars, the term knowledge is defined as combination of contextual information, personal experiences and values. It is more valuable than just information since somebody has already thought in depth about it, and formed an opinion on this information, added his/her personal experience and assessment (Pearlson and Saunders, 2012).

Knowledge itself is divided into explicit and tacit. Explicit knowledge can be easily expressed and communicated through data, formulas, written procedures, etc. While tacit knowledge is deeply embedded in individual's experience, intuition, and beliefs, it is difficult to formulate and communicate (Takeuchi, 2006).

The philosopher Michael Polanyi argued that all explicit knowledge is based on tacit knowledge, and therefore there can be no scientific discoveries without tacit knowledge (Virtanen, 2010). In this regard, successful Japanese companies highlight the importance of tacit knowledge over explicit one, while western companies mostly are concentrated on managing the latter in a more structured way (Takeuchi, 2006). Nevertheless, many researchers consider tacit knowledge as a sustainable competitive advantage source, and believe that this type of knowledge contributes more to the company's innovation (Zhang et al., 2016).

However, in many companies tacit knowledge is underused since organizations usually do not know what they actually know. There are many employees who have long working experience in a certain company, and they so sharpen their skills that sometimes they develop their own "little tricks" of how to conduct a certain work or tackle an issue. And this knowledge is unique, it helps to improve their work productivity. The problem is how to distribute this knowledge to the whole organization (Oleshko, 2016). And it is not

always easy to externalize this tacit knowledge since generally the person himself/herself does not realize that he/she possess something valuable. And when these employees retire or leave the company for other reasons, the firm loses a valuable source of knowledge which is invisible at the first glance. Therefore, the main problem of KM is to externalize this tacit knowledge and provide an easy access to it within the whole organization.

According to KPMG (2000), KM is a regular and structured endeavor to use knowledge in organization to enhance performance. Besides increased performance KM can lead to the innovation within organization (Tan et al., 2007; Belay et al., 2016; Forcada et al., 2012), and to the improved company's growth indicator (Yusof et al., 2012). Pearlson and Saunders (2012) emphasized numerous sources of value of KM such as "avoid reinventing the wheel", "sense and respond to changes more quickly", "manage global competitive pressures", "protect from knowledge loss when workers leave", etc. KM is noted to have multiple of values and basically serves as foundation of success in the rapidly changing world.

Different researchers propose various KM process models. There is no unified standard of KM processes, and organization needs to customize different knowledge flows depending on its requirements. According to King (2009), seven stages of KM process model such as knowledge creation, acquisition, refinement, storing, transferring, sharing, and utilization positively affect the following organizational processes: cooperative decision-making, innovation, and learning on organizational and personal levels. Then these ameliorated organizational processes generate interim results such as better decisions, better products and services, etc. And finally these lead to enhanced organizational performance (King, 2009). Figure 1 clearly represents this impact.

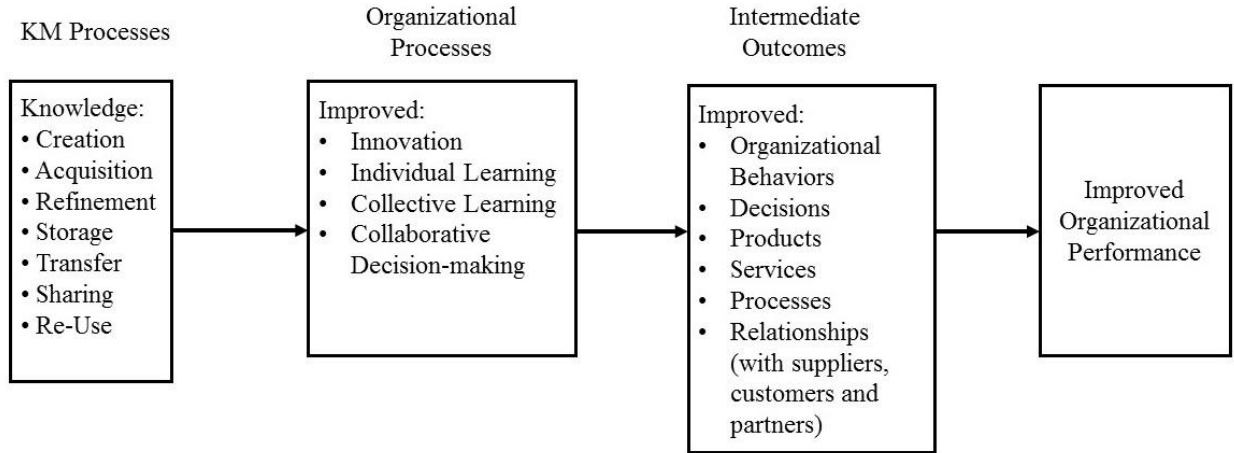


Figure 1. Diagram of the design of King W.R.: KM in an organization. (Reproduced from 20, copyright King W.R., 2009).

It is highly important to describe each part of the process since the process can provide better understanding of KM. Creation stage, according to Nonaka (1994), involves developing new knowledge and replacing some existing knowledge with something new. This stage is based around four sub-processes: socialization (creation of new practices or content through social interaction), externalization (converting created or identified tacit knowledge into explicit knowledge), internalization (the creation of new tacit knowledge from explicit knowledge), and combination (the creation of new explicit knowledge by the means of synthesizing previous explicit knowledge) (Nonaka, 1994).

While the creation stage deals with the internal knowledge development, acquisition stage is about collecting new content from outside (Huber, 1991). The same as the creation stage, acquisition has its sub-processes as searching information, for example, online (Menon and Pfeffer, 2003), then sourcing which focuses on the selection of relevant sources, and grafting which involves hiring specialists with useful knowledge (Huber, 1991).

The next stage which is refinement aims at categorizing, standardizing, packaging, etc. This stage is significant for building a system in which knowledge is systemized. This may be very helpful, especially, when senior management attempts to deliver some messages to

certain level of employees. So, the process maximizes the effectiveness of knowledge delivery and acceptance (King, 2009).

Memory stage means the storage of knowledge on electronic devices or some other shared systems. It is also about the knowledge the employees have, utilize, enrich and share in the purpose to benefit the business processes of a certain firm (ed. Schwartz, 2006). The following two stages – transfer and sharing are similar to a large extent. For instance, if transferring involves sending certain piece of knowledge to certain groups with specific intentions (ed. Schwartz, 2006), sharing means just providing an access to database without purposeful communication of knowledge (ed. Schwartz, 2006). The last stage, utilization, is possible after the completion of each previous stage. The relationship between abovementioned processes can be seen in Figure 2.

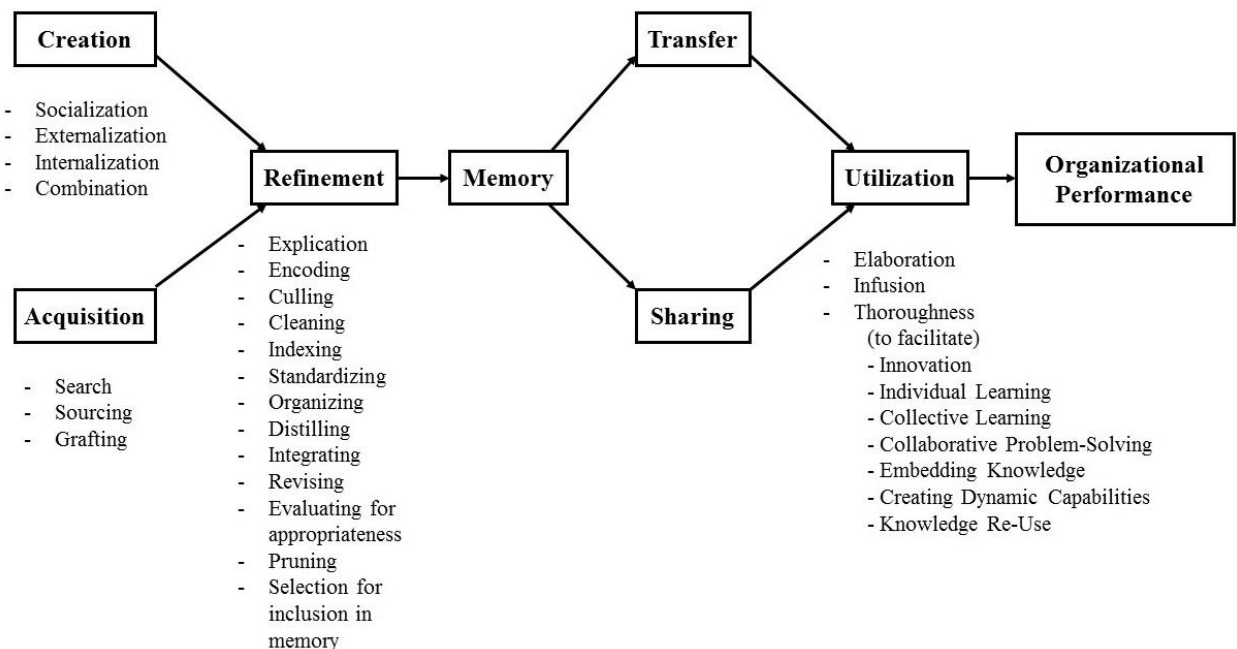


Figure 2. Diagram of the design of King W.R.: KM Process Model. (Reproduced from 20, copyright King W.R., 2009).

KM cycle for BI Group

The scheme on the left visualizes the continuous loop of knowledge conversion from tacit to explicit, and then again to tacit, which takes place in every organization. Two upward

arrows represent how tacit knowledge flows from a holder at an individual level to a group level, and then to an organizational level. And this is known as an externalization of tacit knowledge, or converting tacit knowledge to explicit one. Vice versa, the arrow that shows the direction of knowledge flow from organizational to individual level, represents the explicit-tacit knowledge transformation. And this never-ending process comprises multiple KM stages at each corresponding level.

The KM cycle designed by us includes seven stages which can be grouped in three levels: Individual, Group and Organizational (Figure 3). It can be seen from the Figure 3 that Event, Capturing and Coding relate to Individual level, Validation is in Group level and Sharing, Accepting and Usage belong to Organizational level.

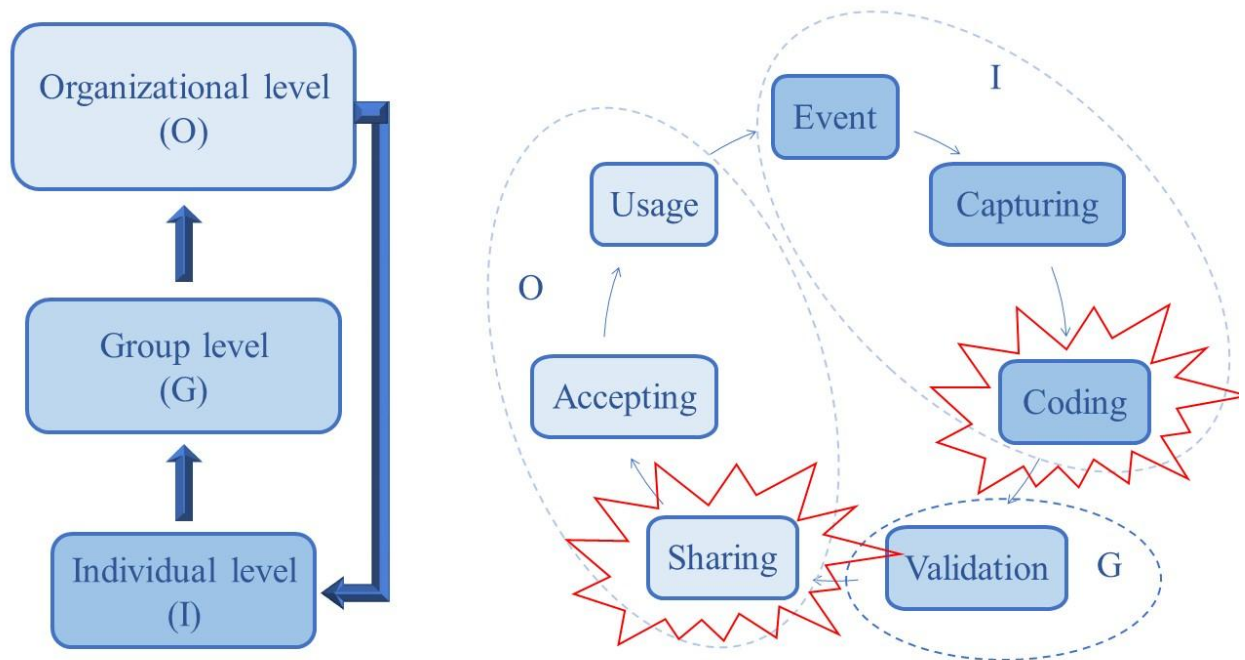


Figure 3. KM cycle.

Event

By “event” we imply an occasion that either promotes the emergence of new knowledge, or requires the use of existing knowledge. For example, participation in the construction

project may result in a new knowledge creation, or conducting interviews with new potential employees might require the use of experience of past interviewing, etc. Basically, the event triggers knowledge generation process.

Capturing

Capturing knowledge means identification of “know-how” that are deeply embedded in an individual’s head by the person himself/herself or by other individual. This “aha” moment represents the capturing valuable knowledge that can be further shared with others.

Construction companies face different kinds of knowledge such as “clients, partners, market information, competitors, project characteristics, employers, materials, suppliers, sub-contractors, vendors, etc.” (Erkan, 2007).

According to Mohapatra et. al. (2016), before starting to identify knowledge, any organization should understand what kind of knowledge is crucial for business development. One of the KM consulting companies, Knoco, can provide guidance in auditing knowledge topics. They have developed multiple criteria to identify “critical knowledge” for a certain company (Carbonnel, 2017).

However, one of the largest construction companies in the world - Bechtel claims that categorizing knowledge into diverse knowledge domains would not provide much benefit for the company, but classifying knowledge based on different dimensions makes sense (Novins and Armstrong, 1998). The following are some characteristics that may help to categorize knowledge:

- Applicability – it shows whether the knowledge can be used worldwide or only in a certain geographical place;
- Transferability - it means the degree of ease of transferability of knowledge to others.

The list does not stop here. The main idea behind this approach lies in the point that when there is a question like: “What knowledge to share?”, the response should not be expressed as “knowledge about this” or “knowledge about that”. The experience has shown that considering knowledge in terms of fields of study is not effective in implementing KM. Rather regarding knowledge in terms of relative degrees of applicability and transferability makes sense.

Knowledge applicability

According to Novins and Armstrong (1998), any knowledge within a company lies somewhere along an interval of applicability. Figure 4 shows how knowledge can be to a certain degree universally applicable.

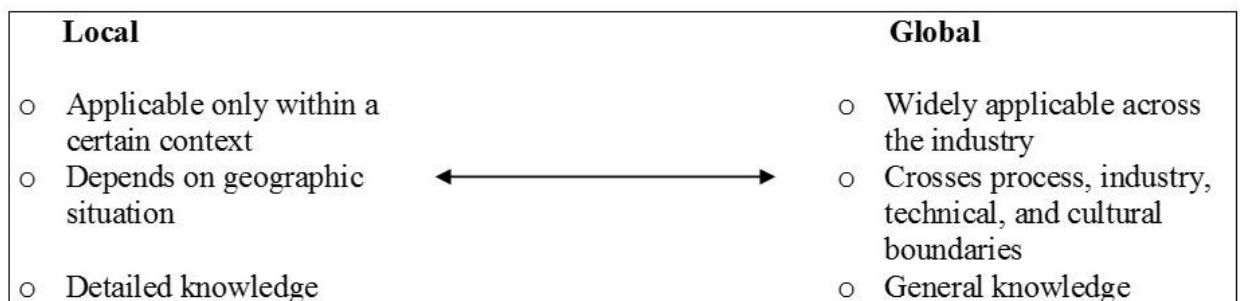


Figure 4. Diagram of the design of Novins P. and Armstrong R. (adapted from 30).

On the one hand, knowledge might be exclusively local in grain. And it can be applied only within a certain context since it depends on a given geographic situation. On the other hand, the knowledge can be global in grain, and therefore can be applied widely across the industry and other different boundaries. One good approach to think about this diapason is by way of detailed against general knowledge. It is worth attention that every piece of knowledge should be regarded and managed in a certain way considering the extent to what universally applicable it is.

Knowledge transferability

Figure 5 represents the degree of the ease of knowledge transferability.

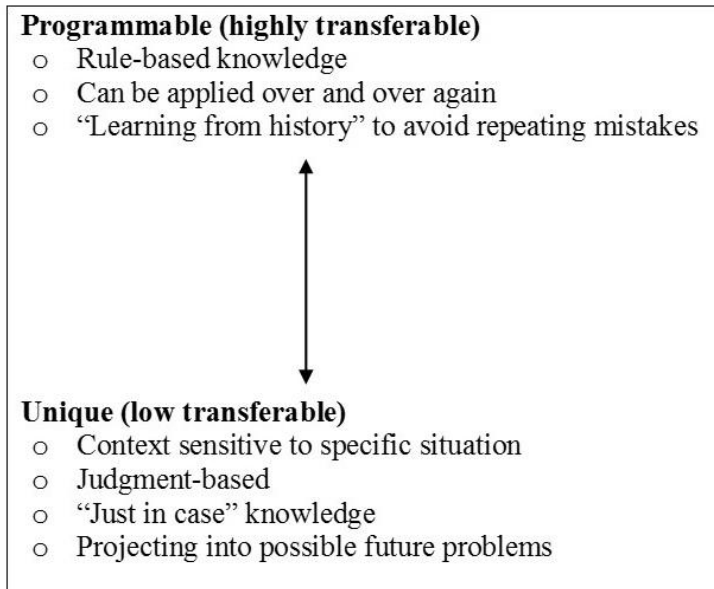


Figure 5. Diagram of the design of Novins P. and Armstrong R. (adapted from 30).

Rule-based knowledge is very easy to transfer since it can be formulated simply and precisely. It can be applied many times without missing its validity. However, transferability is poor when knowledge is based on someone’s opinion and very context-specific. Thus, the interval of the transferability can be presented as grading from the programmable knowledge to the unique one.

If to think about these two dimensions together, then there are four possible knowledge categories will arise. Figure 6 demonstrates the matrix of these types of knowledge.

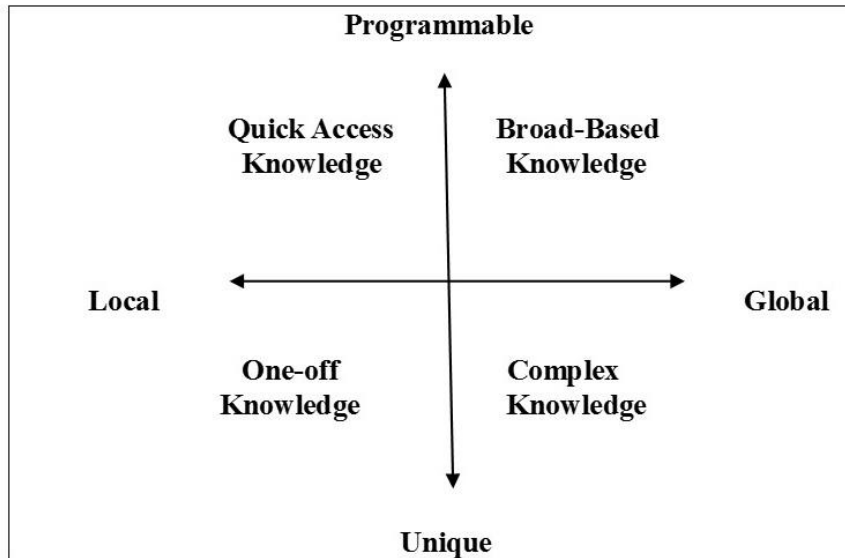


Figure 6. Diagram of the design of Novins P. and Armstrong R.: Categories of Knowledge to manage. (Reproduced from 30, copyright Novins R. and Armstrong R., 1998).

Quick Access Knowledge

A knowledge that is highly transferable, however not very widely applicable. For example, a reservation specialist in a hotel may learn that when Mr. X books a room, he prefers a non-smoking one. Thus, this kind of knowledge can be quickly transferred to others, however it is not widely applicable. (For instance, the conclusion that all citizens from Mr.X's town do not smoke will be wrong). This type of knowledge should be placed in an easy accessible spot within a database for use in the case when needed. It is not recommended to transfer a quick access knowledge to all employees.

Broad-Based Knowledge

It is the knowledge that is easily transferred and at the same time widely applicable. For instance, the instruction of how to keep record of employees' presence at work and fill out the corresponding document may be a good example of broad-based knowledge. Novins and Armstrong (1998) suggest to proactively distribute this type of knowledge throughout the whole organization. It is worth to mention here that many organizations regard most knowledge as broad-based than in reality; and this, unfortunately, is the cause of

“information overload”. One of the solutions is to distribute only information about how to get generally needed knowledge, instead of disseminating the knowledge itself.

Complex Knowledge

This type of knowledge is widely applicable, however very difficult to transfer. The example might be the knowledge of how to control a large-scale project. The best way of transferring it is well organized training program. Another way to transfer the knowledge is an apprenticeship, that is the environment where the learner would be able to gain experience via closer observation of a more experienced individual. The management of complex type knowledge is said to be the only source of sustainable competitive advantage.

One-Off Knowledge

A local knowledge that is difficult to transfer. Novins and Armstrong (1998) present the following example: a network specialist knows how to configure Macintosh system, however since the majority in an organization uses Windows, there is no need to share this knowledge widely. Since the gain from managing one-off knowledge is very little, it is suggested not to make much effort on managing this knowledge. Rather it is sufficient to create informal, thematic networks of employees who might derive a benefit from socializing with each other from time to time.

It has become clear that representing knowledge through two dimensions provides better guidance for knowledge management rather than categorizing knowledge through the lens of domain. In all four contexts balancing of management of people, processes, and technology is essential.

However, such activities as making an impact on people’s behavior, embedding effective processes, and using supportive technology will be differently mixed in each category of knowledge (Novins and Armstrong, 1998). For instance, Quick Access Knowledge is very suitable to computerization, therefore the management should be based on IT. Meanwhile, complex knowledge management requires people management the most.

Next question is who will define the knowledge? At the beginning of KM development, the companies may have specific department or team which would consist of specialists with different qualifications. The requirement for the specialists should be the work experience in a multiple of spheres – project management, HR, media, etc. So, these people should be as versatile as possible. Knowledge capturing by knowledge manager (other person) using outside judgment is recommended in numerous literature. As Mohapatra et. al. (2016) argue, journalists or any other versatile people are suitable for such role. As Friedman (2005) argues, versatile people are going to be highly valued in the future. The experience of these people will assist in the process of knowledge capturing because, having worked in different places, these people are more able to see and capture and then formalize knowledge (Coding stage). These people or KM specialists are important in each phase of the project development but the last phase – “Project close” needs more of the attention. For instance, when the project comes to its end, internal evaluation of project can be organized. During the discussions with the members of the team, the KM specialists can record and formalize valuable knowledge based on successes and failures.

Knowledge capturing can also be done by individual himself/herself using personal reasoning (or reflection). For example, after project completion or after any other event, an individual can be given some time for reflection of what were the lessons learned and the experience gained. Then the employee should formalize the knowledge which he/she found as extremely useful. The idea is to teach each employee manage their own knowledge and use reflection skills. As Oleshko (2016) claims, most people cannot reflect deeply because of various mental barriers. As a result, these people cannot capture knowledge. Therefore, the KM specialists are highly important at the beginning of KM initiatives.

One more issue connected to knowledge capturing is related to individual and social barriers. According to Disterer (2002), the barriers to knowledge capturing exist due to a lack of “constructive atmosphere to articulate and analyze errors.” It is usually not comfortable to reflect on mistakes and therefore, people try to avoid admitting them. The employees are often afraid of letting someone know about their mistakes because of possible negative consequences. From the study of Argyris (1991), the employees become

very embarrassed and closed when they learn that they make some mistakes in the job they do. Thus, the employees may not learn much and lose a chance to capture valuable knowledge.

There is a very interesting argument of Argyris (1991) that professionals hardly ever learn from their own mistakes. This is connected to the fact that professionals rarely make mistakes themselves, therefore, they have not learn how to do that. Thus whenever the professionals make mistakes they become defensive and blame other people but themselves. Interestingly, even though nobody threatens them, such people cannot reflect now when it is necessary.

It is clear from a variety of sources that there is knowledge which cannot be identified due to a few reasons. First, according to Tsoukas (2005), there is knowledge which can be hardly formalized. It is so embedded into one's practice that only he/she can use it. Secondly, some people are not aware of the knowledge they possess. This may happen because of the unstructured knowledge they have. For instance, when a project ends, all of team members may understand and feel that they learned something. However, only few or even nobody really structure it in their heads so that they can use it later. Finally, there are some people who simply do not wish to share the knowledge with other people because of lack of trust and competitiveness.

In many firms documentation of knowledge is not well-organized due to a lack of proper recognition of its importance. Even though some firms have enough technological support, they still miss some important procedures to save knowledge. For instance, some managers may not take into consideration that after the project ends the employees need some phase which would involve reflection. As a result, the knowledge is not secured and lost after some time because the employees are not provided enough support and time (Disterer, 2002).

Coding

The transition from tacit to explicit knowledge starts at Coding stage. Coding stage implies formalizing of tacit knowledge utilizing various methods – documenting, audio or video recording, etc. (Mohapatra et. al., 2016). Coding stage can also be called as knowledge packaging or knowledge representation. Some of the effective methods of packaging knowledge can be examples of learning histories (Anumba, 2005) or storytelling (Payne and Sheehan, 2004). It was proved that people better perceive information if it is more intriguing and engaging. Learning histories were first introduced by MIT; it is a technique of formulating and reviewing project experiences using narratives. Storytelling is found to be very effective in tacit knowledge externalization since a teller can express feelings and share context. And it is mostly used in cases, when there is a need to inspire employees to change or build team spirit, etc.

During an initial formative meeting and interview with the leadership of the BI Group, one of the barriers that were recorded is the fact that employees are not very motivated to accept new ideas. This embraces management questions of how to effectively communicate good ideas in order to make people get interested in them. Precisely, there is the issue related to getting people familiarized with new information. New approaches and ideas are distributed in the company through various network and social media channels, but it appears that employees simply do not read these messages for different reasons.

Why do not employees accept or hardly accept new ideas though they are well shared? For the people, usually senior management, who send these new ideas and information this question is common. So, what is a problem on the ground? Why does it turn out that people do not read or familiarize with new information which may be “beneficial for them”? For BI Group, it is one of the existing issues they struggle to overcome. According to Novins and Armstrong (1998), many firms end up with the problem of overloading their employees with new information. This is not the core of the problem, however. The main issue turns out to be the wrong way of packaging the ideas. Many employers regard the most of information to be broad-based. While this is not true in reality, the information is sent to

everyone leading to the “overload.” Thus, the issue of packaging of the information is really important. Interestingly, the study published by KPMG Consulting in 2000, shows that “information overload” is the second main problem after “no time to share knowledge” with 69 percent. People complained that there was too much information to deal with at that time.

Mefalopulos (2012) claims that “knowledge is still crucial for successful and sustainable development initiatives, but the way knowledge is collected, organized, communicated, and shared needs to be significantly rethought.”. Mefalopulos (2012) emphasizes that the starting point of knowledge dissemination should be the audience and the purpose why one should reach that audience. He further adds that besides just packaging the knowledge, one should also take care of marketing it. The audience needs to be “convinced” that this or that piece of idea or product bears practical significance and can be easily applied in the field of their activity. Based on this idea the following can be inferred: the same information should be delivered differently to different levels in the firm. A typical organizational structure hierarchy for large construction company consists of senior management, middle management, operational management, and employees (Figure 7). To reach each level effectively one needs to think like each corresponding level, whether it is senior managers, middle-level managers, operational managers or craftsmen. One needs to find some ways to get them interested in the information that he/she tries to deliver, using appropriate language style, metaphors, etc.



Figure 7. Organizational structure hierarchy.

Even if the management ensures that there is a good understanding of how to reach each level effectively, the employees may still struggle to accept new information. This is connected to how new knowledge is packaged and presented to the target group of employees. According to Gardner (1995), there are multiple intelligences exist. This means that each person accepts new information differently. This, of course, does not mean that it is necessary to deliver knowledge by all possible different ways. Most of the people can have multiple intelligences which mean that they can be delivered information by a few ways. Thus, it is necessary to define the groups of intelligence the employees possess. This will help greatly in coding the information.

Validation

Coded knowledge should be validated by the KM specialists. These specialists can be from aforementioned department which consists of versatile people. They also can be external experts, professors of universities, etc. or this part of the job can be given to consulting companies.

Tan et. al. (2007) offer two knowledge validation routes. The first one takes place during the knowledge validation meetings. Previously submitted piece of knowledge is thoroughly discussed by the group of KM specialists. It is either approved or rejected right at the meeting. If it is rejected it is deleted from the system straight away. The second route is accomplished online. It is also requires a group of specialists who will be given some options to validate the knowledge. There are three options: “(1) rating-based; (2) majority opinion-based; and (3) comment-based options.” The system decides which knowledge to keep based on these options. For instance, if the knowledge is rated low, it is deleted from the system.

Sharing

“Knowledge sharing implies learning, since learning is a process of acquiring knowledge” (Quintas, 2003). A vast amount of literature emphasizes that sharing of knowledge is crucial. In reality many companies make mistakes by sharing knowledge in a variety of

online clouds and systems because it is not effective. People just do not have any wish to access that knowledge though carefully packaged. The studies found out that people prefer to share knowledge naturally. For instance, if an employee has an issue, he/she would consult his/her rather than go online and look for solution in a database (Quintas, 2003). Researchers claim that informal learning is conducive to the generation of innovations, and therefore it should be considered as a source of competitive advantage in organizations. It mostly happens when employees communicate with each other in casual and relaxed atmosphere which is conducive to sharing of experiences and ideas that are deeply embedded in every individual. For example, it might be an employee talking to consultant in a smoking room, or a team discussing project issues during lunch time, etc. (Oleshko, 2016). Fong (2005) also emphasizes that communication is the vital means of knowledge sharing. Noteworthy, Fong (2005), by communication, means socializing which can, actually, be much better tacit knowledge transmitter. His study reveals that informal environments might assist in discovering fresh ideas and suitable solutions. Davenport and Prusak (2000) emphasized that the managers receive two-thirds of their knowledge via face-to-face communication and just one-third from textual information in the documents. Knowledge sharing may be more effective in a more natural way. Fong (2005) also found out that social events may “enhance relationships, decreasing the distance between team members” (Anumba et al., 2005). So, social events are believed to improve interaction between employees. Fong’s study justifiably raises the issue of competitiveness between employees or different team projects which can prevent knowledge sharing. In their nature, people like to share since it gives them the sense of pride that they helped someone. However, some managers create internal competitions themselves desiring to improve the effectiveness of the work performed. Therefore, many managers have a habit to distinguish “favorite ones” and refer to them as models to follow. The experts advise to redirect internal competitiveness to external against other companies. Fong argues that openness, trust and motivation to share knowledge can be developed by the social events. It was also recognized that the natural processes of knowledge sharing have to be managed and rewarded. Numerous companies had to pass through the process when the employees were targeted because of not sharing knowledge. Thus, establishing the culture of trust and

support is far from simple objectives (Quintas, 2003). Of course, a lack of trust and competitiveness are not the full list of obstacles.

Forcada et. al. (2013) claim that changing mentality might be the right solution applied by KM. While this claim supports Fong (2005), Forcada et. al. (2013) also focus on the lack of time to share knowledge. The tight schedules may not really allow employees to help others. As Sadovykh and Sundaram (2015) claim, face-to-face interactions have become quite difficult in a globalized world. The companies grow becoming dispersed in various geographical locations remote from each other. This is the reason why the information and communication technology is important asset of each flourishing firm.

Bechtel provides good insight into the idea of with whom does knowledge must be shared. They came up with the conclusion that knowledge transferring from many to many is found to be the most beneficial for the company.

Figure 8 represents all possible ways of knowledge sharing.

		Origin	
		One	Many
Recipient	One	<ul style="list-style-type: none"> ○ Apprenticeship ○ Coaching ○ Mentoring 	<ul style="list-style-type: none"> ○ Networks
	Many	<ul style="list-style-type: none"> ○ Presentations ○ Books ○ Articles 	<ul style="list-style-type: none"> ○ Leverage

Figure 8. Diagram of the design of Novins P. and Armstrong R.: Possible levels of knowledge sharing. (Reproduced from 30, copyright Novins P. and Armstrong R., 1998).

The fourth quadrant is considered to be the most effective which is the knowledge imparting from many to many. It is believed that an organization learns more in one day than a person learns throughout the whole career path. Therefore, better decisions are made if they are based on the knowledge derived from an overall organization. An example of many to one mindset of imparting knowledge can be described as follows: a group of

experts are consulting an individual who needs to make a certain decision. Whenever a team discusses project issues on a networked database, the imparting occurring is many to many. There is a growing awareness that the most benefit to be gained from knowledge that is transferred through the way of many to many, and the effort of KM should be put here first (Novins and Armstrong, 1998).

Accepting and Usage

Accepting stage is simply an embracement of knowledge that has already be shared purposely.

The degree of acceptance will directly depend on the quality of knowledge coding.

Also, of course, there is no point to go through all previous stages if the knowledge will not be used by a receiver. When a receiver uses new acquired knowledge (Event), another tacit knowledge is generated in his/her mind, and the cycle continues...

To conclude, it is highly important to integrate the culture of “Life-long learning” through the processes of KM to achieve a competitive advantage. Therefore, cultivating culture of trust and openness is important. For that purposes, a separate department is necessary so that they can develop complex approaches of KM in the company. For instance, if an employee cannot spot what he knows, the department should carefully focus on the development of each process in the aforementioned KM cycle. Construction companies for many years unofficially have implemented KM, however now there is a time for conscious approach to this issue.

4. Best practices and histories of their evolvement

In this chapter, we consider best practices of three big companies – Fluor, Vinci and BP. The former two companies operate and are quite successful in construction sphere while the latter one is oil industry based company. The reasons why we choose Fluor and Vinci companies are because they have rich history of KM development and appear among top construction companies according to ENR. BP was selected since it is an early adopter of

KM which went through almost each stage of KM evolution. The chapter aims to explore the histories of best KM practices' development in order to demonstrate how the experience of the companies contributed to the flow of knowledge. Noteworthy, the practices can be well duplicated by almost any business enterprise including BI Group.

Fluor¹

Fluor Corporation's history starts from the beginning of the 20th century when one Swiss family migrates to the United States. From a small construction firm, it has expanded to the global company being active in more than 100 countries today.² Evidently, the company has rich history and vast experience which can be a focus of deep research directed at bringing improvements and innovation.

The company's history clearly illustrates the application of KM techniques. Will (2008) produced a qualitative research paper which reveals the issue in the company and the way of how the issue was dealt with. One of the major issues was loss of knowledge every time when each project came to its end. Since the work performed in the company has been majorly project-based, it is no wonder that the huge amount of tacit knowledge had been lost. This is connected to the fact that each time the project ended, the teams were disbanded and employees were directed to different projects.

Fluor Corporation wanted to make people stay connected to each other so that any piece of accumulated knowledge can be easily transferred. They came up with the idea to create an online platform which they subsequently called as Knowledge OnLine. Nobody should consider this as the easy solution because it was actually not. Employees were very reluctant to use the platform so additional techniques were clearly necessary.

¹ The practices by Fluor Corporation are initially presented by Amy Javernick Will in his thorough study.

² http://www.fluor.com/about_fluor/corporate_information/pages/history.aspx

First of all, it is important to understand what the platform represents. Knowledge OnLine is more like a social media which allows employees to share their profiles, documents, and participate in discussions. The platform offers a range of knowledge communities from Architectural and Engineering to Business Intelligence and Corporate Security.

Institutionalization of the platform as the fully functional one was possible by the support of top management. The KM team realized that to make employees all around the world interested in the platform would not be an easy objective. Originally, the team tried to create an incentive system based on awarding points to those employees who used knowledge in Knowledge OnLine. After a while, the company stopped to use these techniques since it was not observed to encourage sharing of new ideas.

Another technique was much more effective and was accepted as the one which brought to success. Fluor Corporation initiated “Knowvember Campaign” in 2002. It aimed at awarding those who were very active in Knowledge OnLine. The campaign also included gathering and sharing “Success Stories” which told how people were able to solve different issues at the workplace with the help of the Knowledge OnLine. In less than ten years the Knowledge online grew from 4,000 employees in 2000 to 25,000 in 2008. As the study by Will demonstrates, today success stories are so common that nobody is surprised to hear them. Moreover, there is no necessity to make such cases public because employees started to understand the value of the platform. The communities became employee driven instead of management directive as they used to be in the past.

Vinci

The history of Vinci goes back to the 19th century when two students of one French university set up construction business. The firm has become Vinci in 2000 only after its merger with other construction company called GTM Group. Vinci has been involved in

building dams, developing tramway lines and regional railways. Water and sewer networks have become the core business sometime later too.³

In 1995 Vinci for the first time introduced innovation award among its staff. This was done with the purpose to motivate people to present their innovative ideas to the top management and outside experts. The award was organized twice a year with the aim to provoke innovation and capture knowledge gained from projects. There were several levels of evaluation.

First, all proposals went through assessment of the criteria focused on significance of innovation, personal contribution, the effect on efficiency, other effects and advantages, and innovation process. Then the selected proposals were sent to 17 experts who adjudged up to three prizes in each of the following areas: “product innovation, product adaptation, process innovation, and process adaptation” (Winch, 2012).

Prizes constituted to sum of more than one month wage for each team participant. There were also grand prize awards for the best proposals. All innovations were printed in internal publications with large volume of 5000 exemplars. Most ideas were judged as deserving dissemination.

British Petroleum

British Petroleum (BP) was founded in 1909. The company has long history with a huge experience in exploring, producing, and selling oil and its products all over the world. As the largest oil company in the UK and the fourth largest company in the world, the firm was able to attract outstanding talent. Noteworthy, in the early 90’s the company experienced difficult times. For example, in 1992 the company lost about \$800 million, and it was their first financial loss during last eight decades. What was the problem on the

³ <https://www.vinci.com/vinci.nsf/en/history/pages/index.htm#>

surface? It were falling oil prices and inability of management to manage an extremely diversified business.

The falling oil price was an external economic factor, and it was outside of the direct control of the business. Apparently, the company wasn't prepared for this threat. And, then, to recover, the company started to cut costs and started to think about how to improve productivity. The latter led them to understand their root problem which was "the company's inability to transfer knowledge across its different units" (Pfeffer and Sutton, 2000).

At those times, BP had a huge bureaucracy, and therefore the decision making was a long process. For example, financial documents required 15 signatures before they could be proceeded. And this negatively affected the company's productivity.

At those times, in order to recover from profit loss, Robert Horton, Chief Executive, started to downsize the company. Although it was one of the rational decisions at that time, it brought damage to the company's cultural values as trust and care. The thing is that along with the downsizing the top management during different trainings proclaimed such values as openness, trust, care, and team collaboration. This contradiction between what top management said and what they actually did produced cynicism and anger within a firm.

Moreover, Horton had a harsh managerial style that created only fear in the organization. As a result, there was unwillingness among employees to do their best and to turn their knowledge into action. Horton was fired, but downsizing unfortunately continued.

John Brown, the other Chief Executive, was the one who realized that capturing knowledge and then turning it into practice is essential for company's success. He saw the potential of fostering learning across units. So, the company came up with 4 mechanisms which served as the effective bridges between various business units. These four units were – Peer assists, Peer groups, Other federal organizations, and Personnel transfers. For example, Peer assists, being one of the effective, clearly illustrates the process of capturing

knowledge and turning it into practice. Peer assist implies sending the best employees from one business units to another in order to share experience and solve certain problems within business units. “Sharing talented people with other units might help the firm as a whole, but could negatively affect the short-term performance of the unit that had temporarily lost these skilled individuals”. However, the company emphasized three benefits of such practice. First, the most important, is that knowledge was transferred through employees who did not get only the explicit knowledge, but also the tacit knowledge. This was the way of involving people in the knowledge sharing process. The second benefit is that when you send your employee to other unit, you might need the same assistance one day. The third benefit is that your employees come back with more knowledge and experience than when they left.

In general, Peer assist approach reminds currently modern concept of agile management, when the new team is created quickly to solve the most critical problem that arise in the organization. The new team consists of the best employees from different units who leave their work for a while and switch to other task that is more critical for the company.

Peer groups means establishing confederations of business units that had similar strategic and technological issues. The groups met once in a quarter. And the leader of a particular business unit presented the proposed goals for the coming year to the other members. And the members were expected to actively give advices. This experience helped to build a shared social identity that reduced the trend for the units to consider each other as only rivals.

Another example of KM approach that was successfully implemented in BP was a Virtual Teamwork Program. This included the usage of modern IT, such as video conferencing equipment, multimedia email, shared electronic chalkboards, etc. Geographically dispersed people had a chance to build a network across different parts of BP.

The following accident demonstrates the benefits from this Program: in 1995 there was an equipment failure on a North Sea mobile drilling ship that stopped all operations. The drilling engineers put the broken equipment in front of a tiny video camera that was connected to one of the BP Virtual Teamwork Stations. Then they called the Aberdeen office and asked a drilling equipment expert to diagnose the problem. The drilling equipment expert figured out what was the problem straight away. The problem was solved in a few hours saving large amount of time and money.

As a result of knowledge management efforts, just 5 years later, the company achieved excellent financial performance, even though oil prices had remained low by historical standards.

5. Methodology

5.1. Studying BI Group

In order to assess current situation with KM in BI Group it was necessary to get different points of view from management and from other employees.

The first step is to have a picture of internal environment with regards to KM system in BI Group. Conducting meetings with managers permit to understand their point of view, and based on the results of the discussions elaborate few hypothesis about the current state of the KM in the company. Next, it is necessary to approve or reject the hypothesis based on evidence from the middle managers and lower level employees. This approach permits to get the first approximation of existing issues on different levels.

The second step is to analyze the external context in which BI Group is operating. This analysis permits to identify how to adapt suggestions rising from literature review and best practices to the context of Kazakhstan. Such approach enables better chances of successful implementation of proposed improvements as different context might become a barrier to innovation based on experience of companies operating in different environments.

After conducting several meetings with managers the common understanding for this project has been reached. Since the main objective is to assess the current situation and make suggestions for further improvements across the whole company, it was very important to cover as much employees as possible.

One of the most common ways to collect such data is to either to conduct an interview or to create a survey. Each approach has its advantages and shortcomings, and also there exist some other aspects which have to be assessed and considered before making a decision.

The managers warned us that some people are pretty resistant when it comes to adaptation of new ideas and good practices. To make people more comfortable and to encourage them to be more honest and open, under the shortage of time and human resources of the CP Group 6, it was chosen to conduct an anonymous online survey through Google Forms in Russian language (see list of questions in Annex A with its translation into English language).

The main reasoning is as follows:

- Online survey has a potential to reach much more people given the short time for the capstone project;
- Since answer options are more or less standardized with survey the data is easier to analyze; on top of that the chosen Google Forms tool allows to download the results in convenient MS Excel format
- With survey there is less possibility to interpret wrongly the answers based on respondent's personality, appeal, perception, etc.

In order to see the big picture on KM in BI Group, the Johari window shall be considered (see Figure 9). The proposed capstone project in the area of knowledge management shall focus on the information that is known to the company, but is not extracted or analyzed within the company yet. The proposed solutions shall at least elaborate some useful steps that could be implemented for extraction of the knowledge and preserving it within the company regardless of the employees which initially had this information staying or leaving their jobs.

MATRIX OF KNOWLEDGE

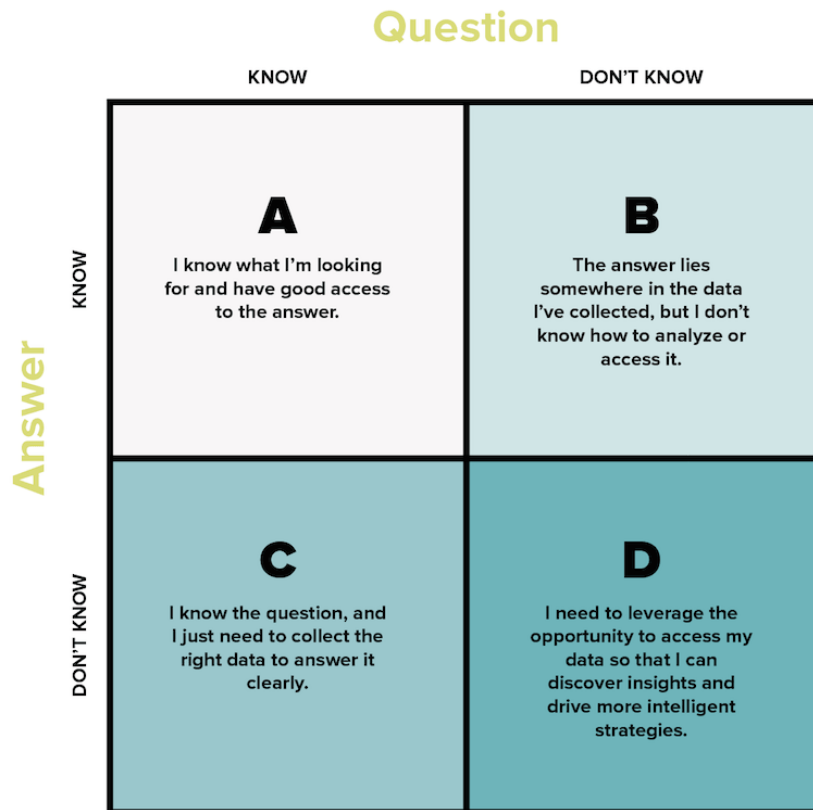


Figure 9. The adaptation of Johari window concept to the knowledge (Source: blog article by Meredith Maycotte at <https://www.umbel.com/blog/services/know-what-you-dont-know/>, 2014)

So, further on the questions shall transform more into this direction:

- How to create new knowledge within the company?
- How to extract the gained knowledge?
- How to share the knowledge across the company?
- How to ensure best use of this knowledge?
- How to manage the knowledge?

5.2. Design of the questionnaire

The hypothesis were elaborated based on management's point of view, and in order to prove them right or wrong it is necessary to analyze other point of view of lower level employees. In order to do so it was decided to conduct an online survey with support of BI Group HR department.

The idea behind the questionnaire is to design questions as simple as possible, and create the environment where the respondents will stay concentrated during whole process and do not get annoyed. In the questionnaire there is implemented the approach of asking questions about the same topic from different angles. The expectations are that such approach will permit to find out how the employees of BI Group actually see the KM within BI Group from different points of view.

The questionnaire contains overall 58 questions divided into 5 sections. The brief description of each section is provided in the figure 3.2. The questions are of 3 types:

1. statements - the respondent shall choose the degree of his relation towards the statement: Strongly agree, Agree, Rather agree than disagree, Rather disagree than agree, Disagree, Strongly disagree;
2. multiple choice questions - the respondent shall choose among the provided statements those ones that reflect his or her thoughts, beliefs and feelings and/or provide another response in free form;
3. reflection questions - the respondent shall elaborate in his own words an answer to a given question.

No.	Title	Description
Section 1 9 questions	General Information	This section contains the questions for collecting the statistical data about the respondents of the questionnaire like gender, educational background, etc.
Section 2 16 questions	What is KM to me?	The term “knowledge management” is briefly explained beforehand, and then there are questions related to KM and its meaning to the respondent. They had then to assess their own level of relation towards each statement and provide answers to open questions.
Section 3 14 questions	What is KM to BI Group?	This section contains questions related to what the respondent thinks about KM in BI Group.
Section 4 7 questions	Information Flow	This section contains questions related to what the respondent thinks about how information flows and is distributed within BI Group.
Section 5 12 questions	Idea Management	This section contains questions related to new ideas and their acceptance in BI Group.

Figure 10. Questionnaire Design

Preliminary to actually sending the link in Google Forms to BI Group, 5 persons were asked to take a survey in order to assess the time required to finish it. On average their results were about 15 minutes.

Chong and Choi (2005) developed 11 theoretical statements that show the link between business success and KM implementation. Some of them include the importance of

employee training and involvement into KM implementation, team spirit and strong leadership, establishment of supporting IT infrastructure, structured knowledge also increases the possibility of successful KM implementation. And the last, but not least proposition is about elimination of organizational barriers which includes motivation and reward systems to encourage employees, diminishing the bureaucracy level, creating a culture of knowledge sharing, and many more.

According to the practical approach to implement KM introduced by Albers (2009), after selecting the KM team and establishing the business case for KM implementation, it is necessary to perform KM assessments and audits. The audit shall focus on determining what information exists, how it is stored, what its value is, how to enhance its value, and how it is managed in order to be useful for the company.

Thus, the questionnaire is designed to get employees' perspective on the following areas:

- what they know about KM and what tools do they use in every day work;
- what do they think their company does to establish KM system, especially with regards to education of the employees;
- how does the company manage the information flow and what is the overall employees' attitude towards information sharing;
- how the new ideas on improvement coming from employees are treated in the company, and do the employees feel that their voice can be heard by the management;
- are there clear organization and responsibility distribution established in the company.

5.3. Expectations

From previous BI Group experience of e-mailing the surveys to its employees the huge success is considered in case of 25% engagement. However, in the beginning of March a lot of construction activities were limited due to weather conditions in Astana, and some employees took their annual leaves while the overall workload is low (especially in BI Group Construction Holding). Among those who stayed engaged in ongoing projects of BI

Group, a lot of employees were extremely busy in the EXPO project which is due in the beginning of May. All these groups of employees were expected to ignore the e-mail.

In order to increase probability of high engagement rate it was decided to e-mail the link from the head of HR who is considered as a strong and powerful figure in the eyes of BI Group employees. It is believed that by doing so the importance and urgency of this questionnaire would have been extremely emphasized.

It was estimated to send the questionnaire on Monday (6th of March, 2017) and give employees 2 full days to fill in the Google Form up to 11:59 PM, 7th of March, 2017.

Realistic expectations were to reach 10% engagement out of 3,550 employees who were actually going to receive the link (about 355 employees).

5.4. Analysis methodology

The results of the survey are planned to be tabulated in Excel spreadsheet in order to assess the degree of correlation between the provided answers with respect to age, gender, education level, familiarity with the ‘knowledge management’ term, etc. This approach permits to reveal the major trends in answers of respondents, and based on these findings the current situation with KM in BI Group can be addressed and improved.

For the reasons of facilitation of correlation analysis the most relevant questions are codified as shown in the Figure 11 below.

	Code	Question
1	AGE	Please, indicate your age
2	GENDER	Gender
3	EDU	Education level
4	EXP	Experience
5	BI EXP	Working in BI Group for ____ years

6	DEV/CON/ENG	In which holding you are working?
7	KM FAM	I was familiar with the term 'knowledge management' before
8	MY KN ASSET	I believe that knowledge is my biggest asset I am providing to my employing organization
9	MY KN APPREC	I feel like my knowledge is appreciated
10	MY KN SUFF	I believe that my level of knowledge is sufficient to fulfil my job duties
11	STUDY MORE	I am willing to study more to explore knowledge not related to my job duties
12	KM DBASE	My organization implemented a special database for storage of the knowledge created by the employees of the company
13	BI CARES	I feel like my employing organization cares about employees who have special knowledge and skills
14	BI RECOGN	My employing organization has a reward and recognition systems for sharing knowledge with other employees
15	SHARE IDEA	If I have an idea on improvements in my company I am willing to share them with my company
16	FAIR TREAT	In our company the ideas and propositions are considered in a transparent and fair manner
17	IDEA ACCEPT	Our company accepts ideas and propositions coming from its employees openly and easily
18	IDEA MOTIV	I believe that my employing organization is trying to motivate its employees to be creative and think out of the box
19	INNO ENV	I believe that my employing organization has environment cultivating creative thinking and idea generation

Figure 11. Codification of the questions for the analysis.

The value of the CORREL function in MS Excel is always between +1 and -1. To interpret a value of the function we consider the following bands:

Value of r	Strength of relationship
1.0 to 0.7	Strong positive
0.5 to 0.7	Moderate positive
0.3 to 0.5	Weak positive
-0.3 to 0.3	Negligible
-0.5 to -0.3	Weak negative
-0.7 to -0.5	Moderate negative
-1.0 to -0.7	Strong negative

Figure 12. Bands for correlation coefficient r

While these bands are arbitrary, they represent a good rule of thumb for interpreting the size of a correlation coefficient in questionnaire research (Hinkle, Wiersma and Jurs 2003)

Patterns related to other questions will be analyzed separately.

6. Analysis

6.1. Hypotheses Formulation

First meeting with the BI Group representatives revealed the recognition of the following issues on the company's side:

- Implementation of lean practices created within the company face the resistance of some employees;
- Application of best international practices, benchmarking is very limited due to availability of information in Russian language;
- Influencing the resistance of people towards novelty and improvement.

BI Group is implementing lean thinking since 2014, and the company managed to achieve some good results, but it's just the beginning. One of the biggest problems is that people are resistant towards novelty and improvements.

The important questions are:

- How to manage the gained knowledge?
- How to motivate those who proposed something meaningful and valuable?
- How to influence the speed of adaptation of improvements across the company?

After the second meeting, the problem was narrowed, and the following hypotheses were proposed based on the standpoint of the managers:

1. *Hypothesis 1:* Employees are resistant towards innovation and lack motivation and inspiration.
2. *Hypothesis 2:* Communication channels are established, but they are not effective enough.
3. *Hypothesis 3:* Mentoring system is established, but it seems not to be working properly.
4. *Hypothesis 4:* Company's database is established, but it is not convenient and is not regarded as effective KM tool.
5. *Hypothesis 5:* KM is not systematic in the company.

Also, it was noted that BI Group management emphasizes the importance of the innovation for company's development and competitive advantages, and some departments and subsidiaries get engaged in implementing improvements right away while others stay aside and be pretty indifferent.

Even though the company demonstrates the strategic vision of knowledge importance, innovation and development by such initiatives as BI Lab, Corporate University, Lean Departments, and all these activities are somehow related to KM in their nature, but it seems to be the case where BI Group never really considered implementing KM system as a separate project and establishing KM strategy. So this capstone project is introducing a

new direction of development to BI Group, and further activities might substantially contribute to the overall business success and top positions in the industry.

6.2. Questionnaire outcomes

Due to internal BI Group reasons the questionnaire was actually sent via e-mailing lists only on 7th of March, 2017 by the Head of BI Group HR department to the planned amount of 3,550 employees' e-mails.

Given that 8th of March, 2017 is a national holiday (International Women's Day) it was decided to keep the link accessible up to the end of the working week - 11:59 PM 10th of March, 2017. The reminder was sent to the same e-mailing list on the morning of 9th of March, 2017.

After closing the questionnaire it was found out that the actual rate of engagement was 5.5% as 195 employees among possible 3,550 in total participated in the questionnaire.

6.3. Sample statistics

Based on the information provided by BI Group and the results of the survey, the following graphs sum up the statistics of the respondents sample on gender, age and education level distribution (see Figure 13, Figure 13, Figure 15).

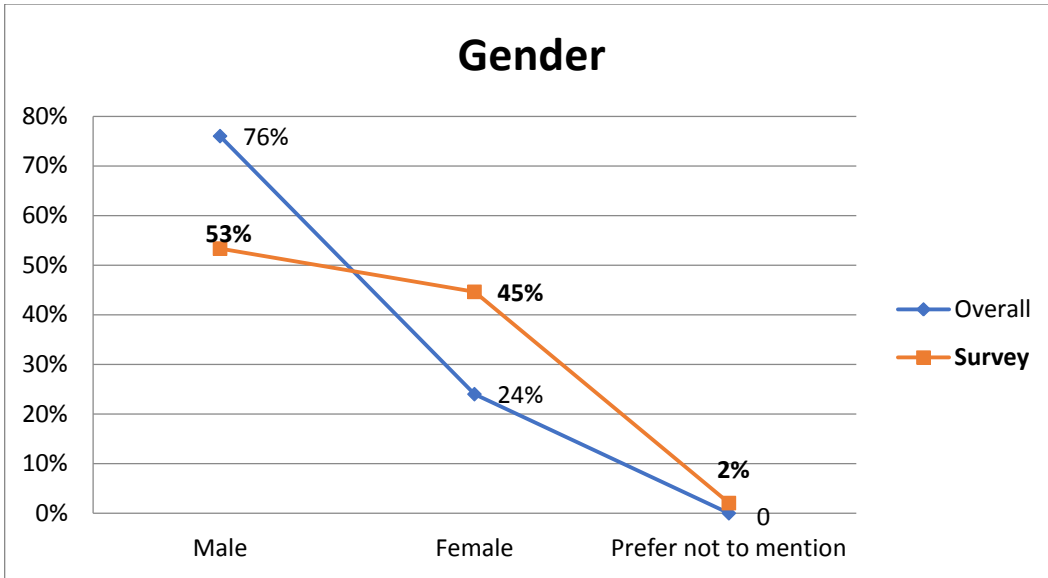


Figure 13. Distribution of employees and questionnaire respondents over gender.

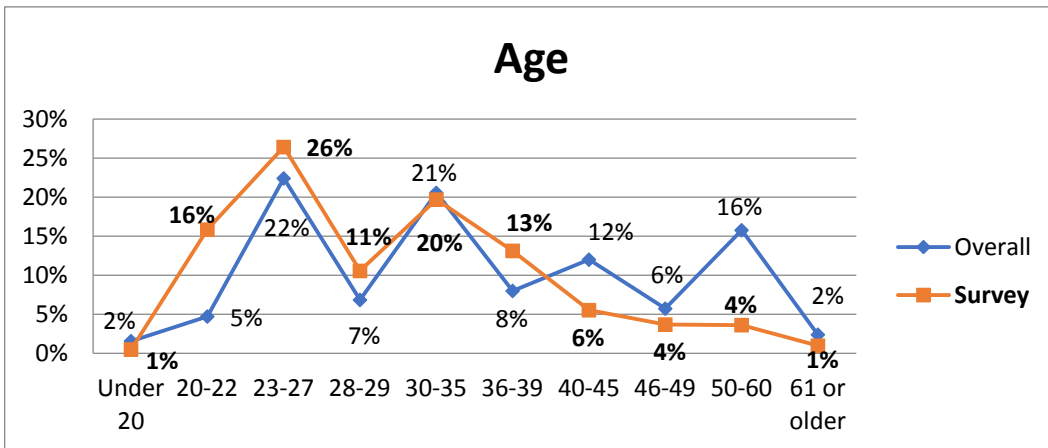


Figure 14. Distribution of employees and questionnaire respondents over age.

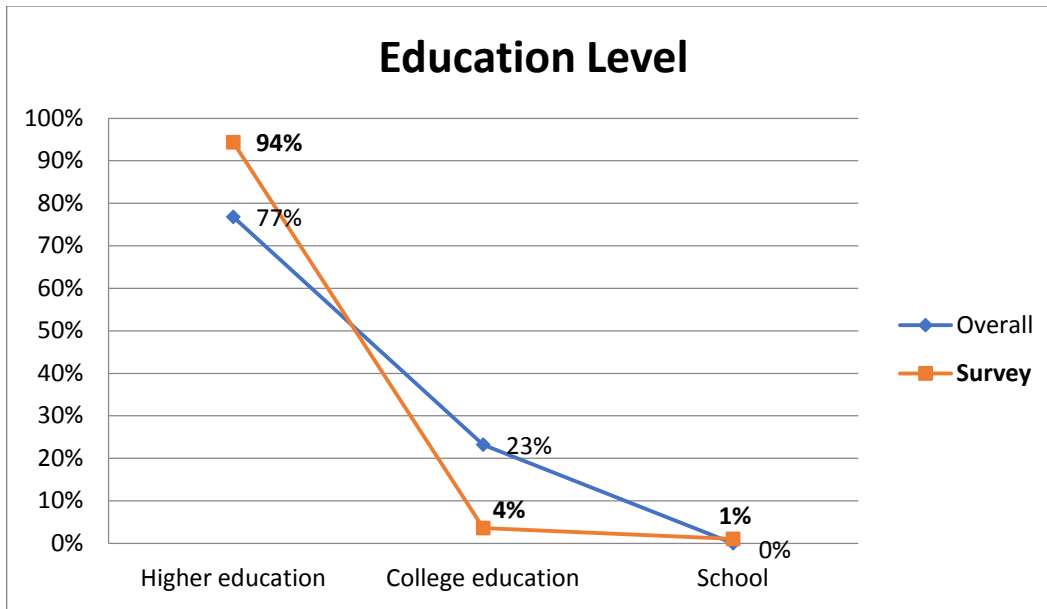


Figure 15. Distribution of employees and questionnaire respondents over gender

Due to the fact that the statistics provided by BI Group had different ranges for age, the interpolation method is applied in order to align the data. As BI Group data contained less detailed education level statistics, survey results were grouped as follows:

- Higher level education – bachelor, specialist, master or PhD degree
- College – secondary level education (in Kazakhstan colleges are accepting students after 9 classes in school)

As in the questionnaire 2 respondents among 195 chose the ‘School (11 classes)’ option for their level of education, and it is very uncommon that big companies in knowledge-intensive industries hire someone without at least college degree, it may be assumed that either the respondents are doing their internship while studying somewhere or they have chosen this option by mistake. The distribution of education level among respondents of the survey is shown in the Figure 16.

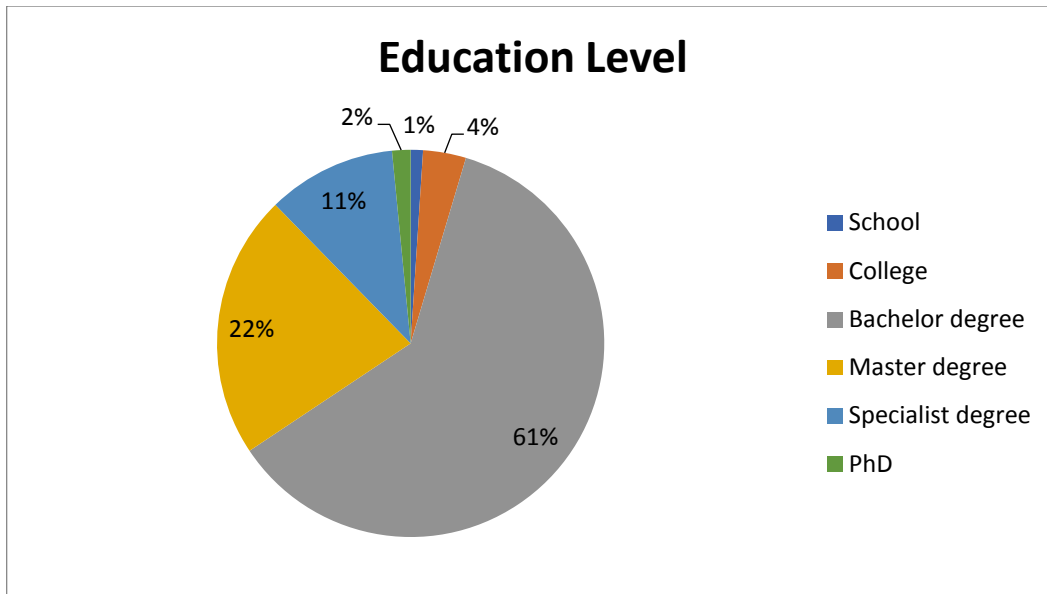


Figure 16. Educational level among respondents of the questionnaire

According to the survey results, the average experience of the respondents is 9.8 years ranging from few weeks up to 43 years. And average experience in BI Group is 2.6 years ranging from few weeks up to 13 years.

Except for Corporate University director who is cross-holding employee, other respondents are from one of three divisions of BI Group Holding (see for details Figure 17):

- BI Group Construction
- BI Group Development
- BI Group Engineering

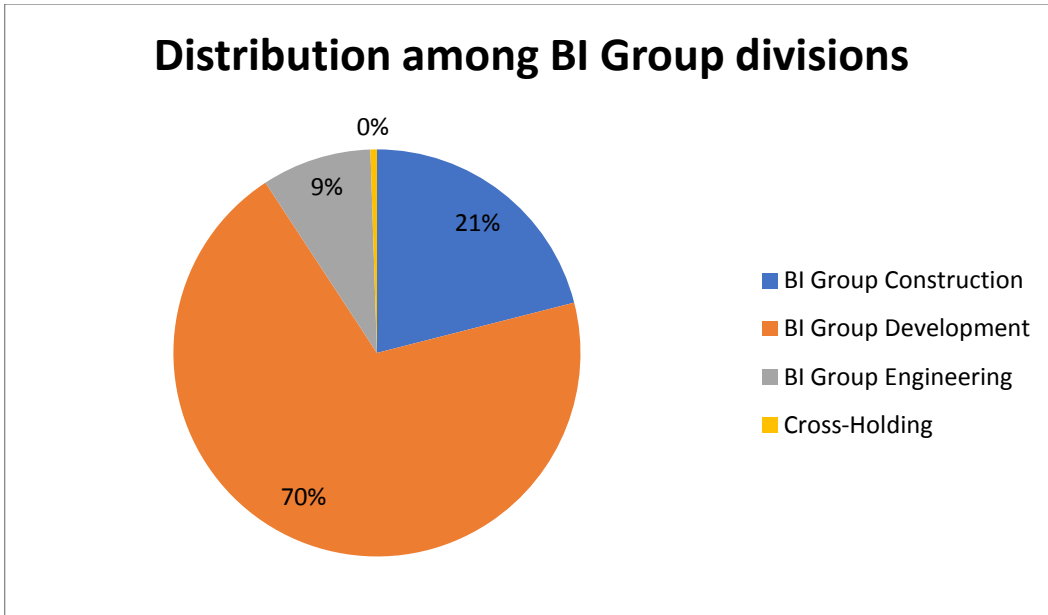


Figure 17. Distribution of the questionnaire respondents among BI Group Holding divisions

6.4. CORREL analysis

The obtained values of application of CORREL function to the codified questions listed in Figure 11 are presented in the form of matrix of correlation coefficients (see Figure 18). In order to facilitate the perception of the results it is then decided to cover the negligible coefficient (see Figure 19), and color code them (see Figure 20) according to the color scheme provided in Figure 12.

	AGE	GENDER	EDU	EXP	BI EXP	DEV/CON/ENG	KM FAM	MY KN ASSET	MY KN APPREC	MY KN SUFF	STUDY MORE	KM DBASE	BI CARES	BI RECOGN	SHARE IDEA	FAIR TREAT	IDEA ACCEPT	IDEA MOTIV	INNO ENV
AGE		-0,01	0,09	0,88	0,28	0,13	0,02	0,04	0,01	-0,02	-0,17	-0,04	-0,11	-0,04	0,03	-0,16	-0,14	-0,06	-0,11
GENDER	-0,01		0,10	-0,07	-0,01	-0,01	0,08	-0,13	-0,13	-0,19	-0,07	-0,06	-0,07	-0,04	-0,16	0,03	-0,01	-0,04	-0,03
EDU	0,09	0,10		0,04	-0,04	0,09	0,15	0,11	0,03	-0,05	-0,18	-0,13	-0,05	-0,23	-0,02	-0,17	-0,12	-0,07	-0,14
EXP	0,88	-0,07	0,04		0,33	0,14	0,06	0,08	0,01	0,00	-0,18	-0,08	-0,16	-0,03	0,03	-0,17	-0,17	-0,07	-0,11
BI EXP	0,28	-0,01	-0,04	0,33		-0,04	0,00	0,06	0,04	0,04	-0,05	-0,07	-0,04	0,13	0,09	0,03	0,06	0,07	0,02
DEV/CON/ENG	0,13	-0,01	0,09	0,14	-0,04		0,12	-0,07	0,06	-0,09	-0,10	-0,11	-0,06	-0,09	-0,05	-0,11	-0,23	-0,25	-0,33
KM FAM	0,02	0,08	0,15	0,06	0,00	0,12		0,13	0,10	0,10	0,02	0,07	0,02	-0,03	0,02	0,00	0,02	0,08	0,08
MY KN ASSET	0,04	-0,13	0,11	0,08	0,06	-0,07	0,13		0,21	0,16	0,21	0,12	0,03	0,03	0,18	-0,07	0,01	0,01	0,06
MY KN APPREC	0,01	-0,13	0,03	0,01	0,04	0,06	0,10	0,21		0,28	0,22	0,15	0,40	0,25	0,21	0,38	0,34	0,13	0,20
MY KN SUFF	-0,02	-0,19	-0,05	0,00	0,04	-0,09	0,10	0,16	0,28		0,24	0,10	0,15	0,02	0,12	0,10	0,12	-0,02	0,07
STUDY MORE	-0,17	-0,07	-0,18	-0,18	-0,05	-0,10	0,02	0,21	0,22	0,24		0,14	0,13	0,13	0,27	0,23	0,22	0,17	0,21
KM DBASE	-0,04	-0,06	-0,13	-0,08	-0,07	-0,11	0,07	0,12	0,15	0,10	0,14		0,28	0,27	0,01	0,13	0,12	0,11	0,26
BI CARES	-0,11	-0,07	-0,05	-0,16	-0,04	-0,06	0,02	0,03	0,40	0,15	0,13	0,28		0,44	0,11	0,43	0,46	0,31	0,45
BI RECOGN	-0,04	-0,04	-0,23	-0,03	0,13	-0,09	-0,03	0,03	0,25	0,02	0,13	0,27	0,44		0,21	0,47	0,34	0,37	0,52
SHARE IDEA	0,03	-0,16	-0,02	0,03	0,09	-0,05	0,02	0,18	0,21	0,12	0,27	0,01	0,11	0,21		0,24	0,26	0,34	0,24
FAIR TREAT	-0,16	0,03	-0,17	-0,17	0,03	-0,11	0,00	-0,07	0,38	0,10	0,23	0,13	0,43	0,47	0,24		0,65	0,38	0,50
IDEA ACCEPT	-0,14	-0,01	-0,12	-0,17	0,06	-0,23	0,02	0,01	0,34	0,12	0,22	0,12	0,46	0,34	0,26	0,65		0,47	0,47
IDEA MOTIV	-0,06	-0,04	-0,07	-0,07	0,07	-0,25	0,08	0,01	0,13	-0,02	0,17	0,11	0,31	0,37	0,34	0,38	0,47		0,63
INNO ENV	-0,11	-0,03	-0,14	-0,11	0,02	-0,33	0,08	0,06	0,20	0,07	0,21	0,26	0,45	0,52	0,24	0,50	0,47	0,63	

Figure 18. Analytical Table of Correlation Coefficients

	AGE	GENDER	EDU	EXP	BI EXP	DEV/CON/ENG	KM FAM	MY KN ASSET	MY KN APPREC	MY KN SUFF	STUDY MORE	KM DBASE	BI CARES	BI RECOGN	SHARE IDEA	FAIR TREAT	IDEA ACCEPT	IDEA MOTIV	INNO ENV	
AGE				0,88																
GENDER																				
EDU																				
EXP	0,88				0,33															
BI EXP																				
DEV/CON/ENG				0,33																-0,33
KM FAM																				
MY KN ASSET																				
MY KN APPREC													0,40			0,38	0,34			
MY KN SUFF																				
STUDY MORE																				
KM DBASE																				
BI CARES									0,40								0,43	0,46	0,31	0,45
BI RECOGN														0,44			0,47	0,34	0,37	0,52
SHARE IDEA																				
FAIR TREAT																			0,34	
IDEA ACCEPT									0,38					0,43	0,47			0,65	0,38	0,50
IDEA MOTIV									0,34					0,46	0,34		0,65		0,47	0,47
INNO ENV														0,31	0,37	0,34	0,38	0,47		0,63
						-0,33								0,45	0,52		0,50	0,47	0,63	

Figure 19. Analytical Table of Non-Negligible Correlation Coefficients

	AGE	GENDER	EDU	EXP	BI EXP	DEV/CON/ENG	KM FAM	MY KN ASSET	MY KN APPREC	MY KN SUFF	STUDY MORE	KM DBASE	BI CARES	BI RECOGN	SHARE IDEA	FAIR TREAT	IDEA ACCEPT	IDEA MOTIV	INNO ENV		
AGE																					
GENDER																					
EDU																					
EXP	0.88																				
BI EXP				0.33																	
DEV/CON/ENG																					
KM FAM																					
MY KN ASSET																					
MY KN APPREC																					
MY KN SUFF																					
STUDY MORE																					
KM DBASE																					
BI CARES									0.40												
BI RECOGN													0.44								
SHARE IDEA																					
FAIR TREAT																					
IDEA ACCEPT									0.38				0.43	0.47							
IDEA MOTIV									0.34				0.46	0.34		0.65					
INNO ENV													0.31	0.37	0.34	0.38	0.47				
						-0.33							0.45	0.52		0.50	0.47	0.63			

Figure 20. Analytical Table of Non-Negligible Correlation Coefficients (Color-Coded)

There is no discernible correlation between AGE, GENDER, EDU, EXP, BI EXP and DEV/CON/ENG other than the expected strong positive correlation ($r=0.88$) between AGE and EXP. There is also weak positive correlation ($r=0.33$) between EXP and BI EXP, which is expected considering the size of the BI Group. These outcomes indicate that while our respondents are but a small sample of the employees of BI Group, this sample is well represented across age, gender, education level, years of experience in general and in the group and the specific divisions of the group.

As regards the opinions of the respondents on the knowledge management and innovation issues, the following observations are in order.

It appears that there is a weak negative correlation ($r=-0.33$) between INNO ENV and DEV/CON/ENG. This means that employees in the Development Division are more amenable to consider the BI Group as an innovative environment, than the employees in the Construction Division and even more so the employees in the Engineering Division.

INNO ENV is moderately positive correlated with BI RECOGN ($r=0.52$), FAIR TREAT ($r=0.50$) and IDEA MOTIV ($r=0.63$). This means that employees that consider the BI Group as an innovative environment mostly feel that the Group motivates innovation, treats fairly their ideas and ultimately recognizes them.

BI RECOGN has also weak positive influence on IDEA ACCEPT ($r=0.34$) as well as BI CARES ($r=0.46$). This shows the correlation of having a reward and recognition system and caring about employees' knowledge with image of accepting ideas easily in the eyes of BI Group employees.

INNO ENV shows weak positive correlation with BI CARES ($r=0.45$) and IDEA ACCEPT ($r=0.47$). This shows that in the eyes of employees the company that has an environment cultivating creative thinking is rather caring about human resources and accepting ideas coming from employees more easily.

FAIR TREAT is also demonstrated moderately positive correlation with IDEA ACCEPT ($r=0.65$) and weak positive correlation with IDEA MOTIV ($r=0.38$). This means that for BI Group employees easy acceptance of the ideas by the employer is linked to the feeling of being treated in an open and fair manner, and there is also a weaker relation of BI Group's will to motivate employees to share ideas to fair assessments of those ideas.

IDEA MOTIV has a weak positive correlation with BI CARES ($r=0.31$) and BI RECOGN ($r=0.37$). This is an indication of connection in the eyes of the employees of caring about employees' knowledge and establishing the reward and recognition system with motivating employees to share good ideas.

IDEA MOTIV is also demonstrated weak positive correlation with IDEA ACCEPT ($r=0.47$). This is an indication of the fact that if BI Group accepts new ideas openly it also contributes to the motivation of employees to think out of the box.

According to the results, employees' willingness to share ideas (SHARE IDEA) has weak positive correlation to IDEA MOTIV ($r=0.34$). This is the sign of the fact that an employee in order to actually share the idea with the company has to be aware of company's intention to motivate employees to do so.

FAIR TREAT is also weakly positive correlated to BI CARES ($r=0.43$) and BI RECOGN ($r=0.47$). This means that employees tend to feel like sharing ideas if they feel that BI Group cares about knowledge their employees possess and recognizes the successful ideas of their employees if they submit one.

MY KN APPREC shows weak positive correlation with BI CARES ($r=0.40$), FAIR TREAT ($r=0.38$) and IDEA ACCEPT ($r=0.34$). This means that caring image of the employing company, fair assessment and easy acceptance of the ideas from employee contributes to his or her feeling that their knowledge is appreciated.

There is another weak positive correlation between BI CARES and BI RECOGN ($r=0.44$). This illustrates a pretty logic idea: if BI Group establishes a reward and recognition system, then an employee thinks that BI Group cares about his or her knowledge.

6.5. Other patterns

Only 47% of respondents stated that they were familiar with the term 'knowledge management' before taking the survey, which means that awareness among employees is not very high.

BI Group management stated that the company made attempts in establishing proper mentoring system, and it is supported by the survey results as only 2% of respondents stated that they didn't have a mentor. However, only 36% noted that a mentor connected with them easily, and it might signal that mentoring program is not a part of culture, but rather an induced action.

A good sign is that respondents tend to think that other employees are willing to help them with work-related questions (90%), and only 5% are pretty sure that this is not the case. But still among believers in assistance there are almost half (44%) of respondents who still try to solve the issues by themselves.

92% admit that colleagues approach them if they need any help, and among them 70% are sure that their knowledge is appreciated, 28% rather agree or disagree. Another 16% confess that they are getting too many requests from colleagues.

The majority of respondents (98%) search in Russian, while on the whole half of the sample (49%) believe English sources are more reliable. Search in English is done preferably by young people (53% of English searchers are under 30).

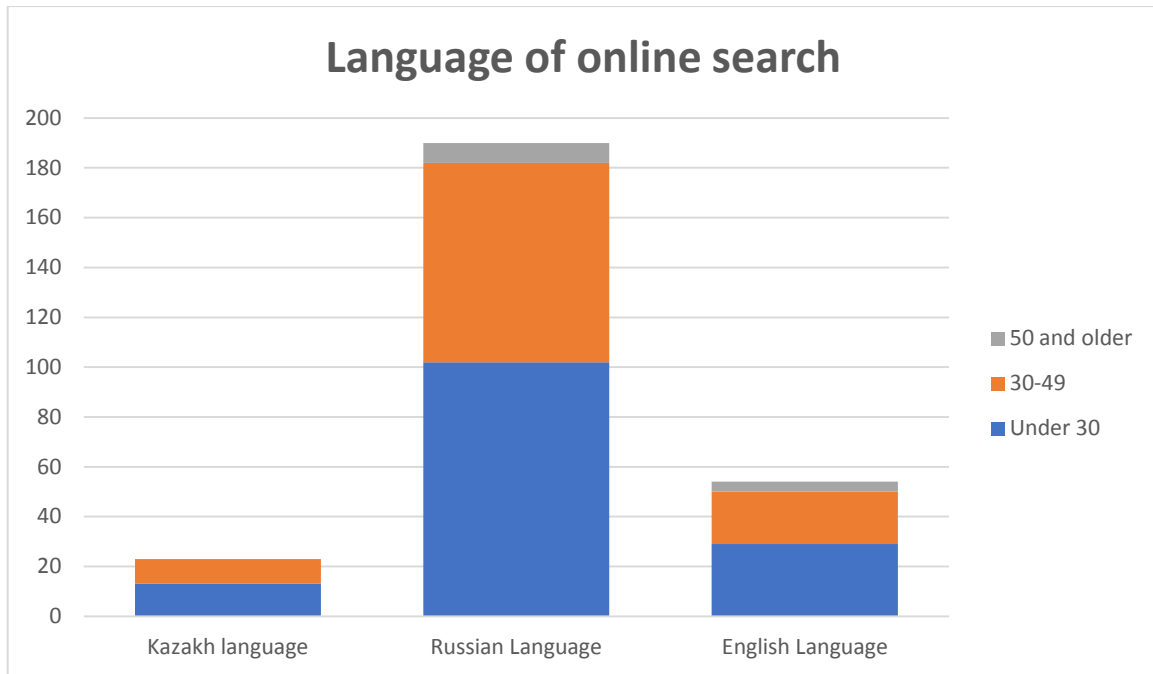


Figure 21. Language of preferable online search with regards to the age of respondents

Only around 36% of respondents are willing to share their ideas on improvements, and no more than 60% of them know exactly to whom submit an idea. This means that roughly 20% of respondents both want to share the idea and know to whom to address, which cannot be considered as a high level.

Half of respondents admitted that there was an assigned mentor to them when they were newly hired, and 35% of them don't have the mentor anymore, yet 9% still feel that they need a mentor.

34% of respondents agree that BI Group gives equal opportunities to everyone. Comparable level (36%) believes that new ideas are assessed in transparent and fair manner. 43% admit that company is open minded towards ideas and suggestions coming from employees. 39% are motivated and inspired by existing reward system in the company.

56% of respondents agree that there exists company's database for storing knowledge generated by employees, however, only 55% of them mentioned that they actually use it. This can be a sign of limited access to the database, inconvenient search tool or poor systematization of the knowledge extraction.

Less than a half of respondents (43%) agreed that existing communication channels are sufficient. Other respondents had a lot of different suggestions ranging from proposition of certain options up to expression of dissatisfaction with redundancy and unstructured nature of information. More remarks can be observed in the Annex B (Tabulated answers of respondents in Russian language with translation into English language).

6.6. SWOT analysis

In order to have rough overview of the context in which BI Group operates and how the company fits into this environment it is decided to conduct SWOT analysis.

Strength. BI Group is a major player of the Kazakhstan's construction market which is the first company ever to be listed on the ENR Top 250 Global Constructors list since 2014. The company consists of three holdings with specialties in residential buildings (BI DEVELOPMENT), infrastructure (BI CONSTRUCTION) and industrial construction (BI ENGINEERING). Recently BI Group started its operations in Russia, and plans to expand to other countries as well. Innovative initiatives such as BI Lab research center, Corporate University, Lean Departments contribute to the positive image and competitive advantage.

Weakness. High dependence on engineering candidates pool still exists regardless of abovementioned innovative initiatives. However, company is determined to minimize the effects of such dependence, probably, the results from such efforts will be seen in the future. Another weakness is the quality of construction which is the common weakness in Kazakh construction sector, yet the company strives to improve situation in multiple directions starting from on-site quality management improvement and up to implementing

ranking system for subcontractors in order to favor those who comply more in terms of quality.

Opportunities. Construction boom in Kazakhstan started from the transfer of capital from Almaty to Astana in 1998 gave first impulse to the development of the new company back in the beginning of 2000-s, and the volume of construction is still very high in Kazakhstan, CIS states and worldwide. Also, the State program of industrial-innovative development of Kazakhstan (the recent one is for the period of 2015-2019) gives stimulus for the development of infrastructure and industrial construction sectors.

Threats. Dependence of Kazakhstan's market of construction materials to international market which, in turn, depends on currency exchange rate. Recent devaluation of the national currency substantially changed the cost structure for all the purchases from abroad.

This analysis shows that BI Group is already on the leading positions on Kazakh market with 920 million USD sales in 2016, and there are still possibilities to sustain company's growth both in Kazakhstan and abroad.

Given the fact that the information and knowledge are invisible assets, the companies cannot fully be aware what exactly their employees know and what knowledge is available outside the company. Thus, the role of knowledge management is to define what kind of information the organization needs and also to determine where and how to gain this knowledge and then apply it. The construction companies tend to have traditional culture and people might be denying that sharing their knowledge is beneficial in any sense to them. (Palmer and Platt, 2005)

Since KM system can positively influence company's performance and efficiency, this tool cannot be ignored during the planned expansion of operations. Branches outside Kazakhstan will obviously benefit from the culture of sharing knowledge and innovative ideas, fruitful cooperation and increased level of communication.

7. Major findings and suggestions to BI Group

Hypothesis 1 (Employees are resistant towards innovation and lack motivation and inspiration) is not supported across the whole company, but there certainly are areas where BI Group can strive to improve the situation. In order to involve as much people into idea and suggestion generation process as possible, BI Group shall concentrate on establishing clear and transparent procedures of idea submission and its further assessment. This will also apparently contribute to placement of innovation friendly environment and thinking out of the box. According to Humphrey (2005), motivation is staying high for employee if his or her ratio of reward over invested efforts is not low as compared to other employees. This means that sustaining equality among employees in terms of rewards, opportunities, access to information, and access to educational programs is extremely important.

Hypothesis 2 (Communication channels are established, but they are not effective enough) is supported. Respondents witness that despite of rich list of implemented channels, they are not working properly due to inability to provide employees with well structured timely information limited to what is necessary and what can be digested by a human being.

Hypothesis 3 (Mentoring system is established, but it seems not to be working properly) is supported due to the fact that about half of sample didn't have a mentor in the beginning of work for BI Group even though management stated that the system is established. This is one of the areas for improvement which can lead to enhancement of impartment of knowledge, broadening of company's heritage and better connection between experienced and young specialists.

Hypothesis 4 (Company's database is established, but it is not convenient and is not regarded as effective KM tool) is supported. Since only a little more than 30% of respondents use the company's database for storage of knowledge generated by employees, it means that there is much more to do in terms of improvement of IT support of KM system. One of the steps suggested by Albers (2009) is to perform an IT assessment as information technologies are considered as major enabler of knowledge processes, and if an

organization lacks IT capabilities in some areas knowledge management might not be supported enough.

Hypothesis 5 (KM is not systematic in the company) is defeated right away with the answers to the question ‘Who is responsible for KM in BI Group?’ as answers vary from HR to Top Management. This is a very clear sign that there is no systematic approach applied.

Framework suggested by Albers (2009) consists of five steps, and the very first thing on the to-do list is assigning a dedicated knowledge management team that will lead the whole process. This team shall consider implementation of knowledge management as a project, and the members shall possess knowledge about the company, its employees, knowledge management approaches and other important aspects which will contribute to the success of this initiative.

Since BI Group has three holdings within one company, it might be pretty reasonable to dedicate single common team rather than separate departments working only for one holding. Lean Departments which are currently established separately in each holding of BI Group might become the basis for creating an aggregated department responsible for KM system implementation and maintenance, and lean approach can become a part of the overall strategy of KM in BI Group, and thus become the part of the routine of such department.

8. Conclusions and further study

BI Group is a rapidly developing company which aims to be at the edge of innovation. Before it did not practice systematic approach towards knowledge management, but the company already showed understanding that information flows are not smooth and there are some issues to be addressed in this area.

Since employees of BI Group Development division tend to be more involved into the process of idea generation and work in creative environment, pilot projects shall preferably be started among most involved and motivated employees of this branch of BI Group, but another approach can be to conduct smaller projects in each division separately or have a pilot project involving most creative representatives of all three holdings.

Innovation is not broadly accepted across the company, so the hypothesis of management suggested that possible reason might lie in ineffective communication channels and lack of motivation, but the intensive research of current situation of KM in BI Group showed that it was not the only problem.

Further study shall address the adaptation of best practices described in this paper to BI Group's case and pilot projects aiming to examine which way of implementation will be most effective.

The example of Knowledge OnLine introduced by Fluor Corporation can become a model of successfully implemented database of knowledge purely generated by employees, however, this approach shall be substantially modified in order to become more simple. Existing database and BI Life mobile app are a good starting point to make comparison and establish plan of implementation of common database of knowledge. The situation with existing IT systems shall be investigated, assessed and studied for the subject of possible strengthening of dedicated support to KM system.

Even though existing reward system satisfies some of the employees, it surely can also be improved. The showcase of Vinci is a good example when the reward system is not purely monetary, the recognition of the authors of the best ideas also plays a major role. Another lesson that can be learned and then applied is the transparency of the evaluation process which involved outside experts as well. Public attention to the contest and wide distribution of the results combined with big money prize today attracts submission of over two thousands of projects while back in 1995 the number was only 121. This should encourage BI Group to think bigger when it comes to motivation and reward systems and contests.

The possible direction of further research is to create new strategy for definition of more clear processes of idea management, increased transparency and the competence of assessors for the submitted ideas.

Since the existing mentoring system proved to be unworkable, forthcoming improvement source can be found in adaptation of experience of British Petroleum initiatives. There are some certain similarities among BP and BI Group – both companies have different business units that have similar technical and strategic issues, but the possibility of using this experience shall be studied more thoroughly with the use of pilot projects tool.

Implementation of Knowledge Management system is always a major change for any given company, thus the change management tools shall be considered. The current state and desired state shall be further analysed in order to define the existing gap. This will enable better understanding of what and how to implement the KM system.

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ANNEX A: Questionnaire in Russian language and its translation into English language

BI Group – Управление знаниями Анонимный опрос

Секция 1. Общая информация

Данный раздел включает в себя вопросы для сбора общей информации, необходимой для подведения статистики о респондентах вопросника.

Прежде, чем Вы начнете...

Данный опрос проводится в формате анонимной анкеты и призван получить данные для анализа текущей ситуации с управлением знаниями в Вашей компании и оценки того, какие улучшения и нововведения с большей вероятностью можно внедрить для качественного развития компании.

Опрос состоит из 5 разделов и должен занимать не более 15 минут. В вопроснике предложены несколько типов вопросов:

- 1) утверждения - Вам необходимо выбрать степень того, насколько данное утверждение подходит Вам, таких вопросов больше всего;*
- 2) вопросы с вариантами ответов - необходимо выбрать 1 или более вариантов, подходящих Вам, или предложить свой вариант ответа;*
- 3) открытые вопросы - здесь Вам предлагается написать все возникшие мысли.*

Мы надеемся, что Вы будете отвечать честно, так как после анализа Ваших ответов будет составлена общая картина текущей ситуации и предложены пути развития и улучшения для повышения эффективности работы Вашей компании!

Пожалуйста, укажите Ваш возраст: до 20 лет, 20-29 лет, 30-39 лет, 40-49 лет, 50 или более лет

Пожалуйста, укажите Ваш пол: мужской, женский, предпочитаю не указывать

Откуда Вы родом? Астана, Алматы, Акмолинская область, Актюбинская область, Алматинская область, Атырауская область, Западно-Казахстанская область, Жамбылская область, Карагандинская область, Костанайская область, Кызылординская область, Мангистауская область, Южно-Казахстанская область, Павлодарская область, Северо-Казахстанская область, Восточно-Казахстанская область, свой вариант

Уровень образования: среднее (9 классов), среднее (11 классов), колледж, бакалавриат, магистратура, специалитет, PhD

Укажите любую дополнительную информацию об уровне Вашего образования (например, наименование учебного заведения, год выпуска, специальность и т.д.)
(открытый вопрос, не обязательный)

Опыт работы: _____ лет

Опыт работы в BI Group: _____ лет

Укажите текущую должность/позицию (например, директор департамента, начальник отдела, специалист и т.д.)

К какому холдингу Вы относитесь? BI GROUP CONSTRUCTION, BI GROUP DEVELOPMENT, BI GROUP ENGINEERING, свой вариант

Секция 2. Что я знаю об Управлении знаниями?

Управление знаниями (Knowledge Management) - это процесс создания, распространения, использования и управления информацией организации. Этот термин относится к междисциплинарному подходу к достижению целей организации благодаря нахождению наилучшего применения знаниям. (Википедия).

Данный раздел включает ряд утверждений, которые относятся к управлению знаниями и тому, что это может для Вас значить. Вам необходимо оценить степень Вашего согласия с утверждениями.

Я был знаком с термином "Управление знаниями" ранее. Да, нет, свой вариант

Я считаю, что мои знания - это наиболее ценный ресурс, который я предоставляю для моего работодателя. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Наставничество: выберите одно или несколько утверждений, с которыми Вы согласны.

- a. При моем трудоустройстве мой работодатель назначил мне наставника.
- b. Этот наставник легко шел на контакт со мной
- c. Наставник выражал явное желание помочь мне, направлять, отвечать на мои вопросы.
- d. Я до сих пор прикреплен к данному наставнику.
- e. У меня теперь другой наставник.
- f. Я больше не прикреплен к наставнику.
- g. Я чувствую, что мне до сих пор нужен наставник.
- h. Свой вариант

Выберите одно или несколько подходящих утверждений. Если я не знаю чего-то по моей непосредственной работе, я предпочту с наибольшей вероятностью:

- a. обратиться за помощью к коллеге, в обязанности которого входит помощь мне по рабочим вопросам.
- b. обратиться за помощью к другому коллеге, в обязанности которого не входит помощь мне по рабочим вопросам.
- c. осуществить поиск ответа своими силами (в интернете, в документации, соответствующей литературе и т.д.)
- d. попробовать разрешить вопрос сам методом проб и ошибок

Если мне необходимо получить информацию у кого-то из коллег, они охотно мне помогают. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Если мне необходимо получить информацию, необходимую для выполнения моих рабочих обязанностей, я знаю, к кому из коллег необходимо обратиться. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Мои коллеги часто обращаются ко мне с вопросами, если они чего-то не знают по работе. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Я думаю, что мои знания ценятся. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Мне кажется, что уровень моих знаний достаточен для выполнения моих должностных обязанностей. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Я знаю, какие области знаний, необходимых для выполнения моих должностных обязанностей, требуют от меня дополнительного изучения, работы, практики. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Я хочу больше учиться для освоения новых знаний, не связанных с моей работой. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Когда мне нужно найти в интернете, я ищу источники на этом языке: казахский, русский, английский, свой вариант (*несколько вариантов из списка*)

Мне кажется, что при поиске в интернете на английском языке больше достоверной информации. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Я знаю, как мой работодатель может помочь расширить мои знания. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Выберите подходящие Вам утверждения, а также при желании напишите свои комментарии/предложения о том, как Ваш работодатель заботиться о Вашем личном развитии и расширении знаний/компетенций:

- a. Я ранее обучался в нашем Корпоративном университете
- b. Я обучаюсь в нашем Корпоративном университете в настоящее время

- c. Я хочу/планирую обучаться в нашем Корпоративном университете в будущем
- d. Мой работодатель утвердил для меня план обучения/план личного развития
- e. Мой работодатель утверждает план обучения/план личного развития для каждого сотрудника
- f. Свой вариант

Если Вы участвовали в обучении, организованном Вашим работодателем, укажите, сколько раз. Это могут быть семинары, тренинги, курсы повышения квалификации, магистратура и т.д. (*открытый вопрос*)

Секция 3. Управление знаниями в моей компании

Данный раздел включает ряд утверждений, которые относятся к управлению знаниями в Вашей организации.

В моей компании есть специальная команда/отдел, отвечающий за Управление знаниями в нашей организации. Если да, как она называется? (*открытый вопрос*)

Новички в моей компании проходят специальное обучение по теме управления знаниями. (*один вариант из списка*)

- a. все новички в обязательном порядке
- b. некоторые новички
- c. никто не проходит такого обучения

В моей компании внедрена специальная база данных для хранения знаний, созданных сотрудниками компании. да/нет

В моей компании у всех сотрудников равные возможности для личного роста через образование. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Мне кажется, что моя компания дорожит сотрудниками, у которых есть специальные знания и навыки. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Мне кажется, что моя компания организует работу так, чтобы сотрудникам было ясно, где и у кого они могут получить информацию, необходимую для работы. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Моя компания внедрила формальные и неформальные каналы распространения информации. да/нет

Если Вы ответили "да", на предыдущий вопрос, укажите подробнее, какие каналы внедрены: *(несколько вариантов из списка)*

- a. база данных компании
- b. веб-сайт компании
- c. системы обмена мгновенными сообщениями (например, WhatsApp)
- d. Средства для интернет теле- и видео-конференций (например, Skype)
- e. Социальные сети (например, Facebook, VK.com)
- f. Печатные издания (журналы, бюллетени и т.д.)
- g. E-mail рассылки
- h. Свой вариант

Если Вы ответили "да", на предыдущий вопрос, укажите подробнее, какие каналы используете лично Вы: *(несколько вариантов из списка)*

- a. база данных компании
- b. веб-сайт компании
- c. системы обмена мгновенными сообщениями (например, WhatsApp)
- d. Средства для интернет теле- и видео-конференций (например, Skype)
- e. Социальные сети (например, Facebook, VK.com)
- f. Печатные издания (журналы, бюллетени и т.д.)
- g. E-mail рассылки
- h. Свой вариант

Какие каналы, которые еще не внедрены компанией, Вы бы хотели дополнительно внедрить? *(открытый вопрос)*

Мне кажется, что моя компания подчеркивает сотрудникам важность самообразования. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Мне кажется, что мои руководители обладают большими знаниями, чем я. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Мне кажется, что в моей компании правильные люди работают на правильных позициях в отношении уровня их знаний, навыков, возможностей и потенциала. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

В моей компании введена система поощрений и признания за передачу своих знаний другим сотрудникам. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Секция 4. Формализация информации

Данный раздел включает ряд утверждений, которые относятся к процессу извлечения и формализации знаний в Вашей организации.

Я составляю отчеты: *(несколько вариантов из списка)*

- a. постоянно на еженедельной основе
- b. постоянно на ежемесячной основе
- c. после завершения определенного мероприятия/этапа проекта
- d. свой вариант

Мои отчеты видит только мой руководитель/начальник. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Я получаю рабочие задания только от одного четко определенного человека. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Мою работу контролирует и мониторит только один четко определенный человек. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Должны ли Вы присутствовать на совещаниях? Если да, сколько раз за месяц?
(открытый вопрос)

Выберите одно или несколько утверждений, с которыми Вы согласны: *(несколько вариантов из списка)*

- a. Вся информацию, которая необходима мне от коллег для работы, я получаю вовремя
- b. Вся информацию, которая необходима мне от коллег для работы, я получаю без напоминаний с моей стороны
- c. Чтобы получить информацию, которая необходима мне от коллег для работы, я прилагаю очень много усилий
- d. Мои запросы на получение информации от коллег игнорируются
- e. Мои запросы на получение информации от коллег отклоняются
- f. Некоторые мои коллеги создают препятствия для потока информации внутри компании
- g. Я не хочу отвечать на запросы о получении информации от некоторых коллег по личным причинам
- h. Я получаю слишком много запросов на информацию от моих коллег
- i. Запросы на информацию от моих коллег отвлекают меня от работы
- j. Свой вариант

Как можно улучшить поток информации в Вашей компании? *(открытый вопрос)*

Секция 5. Управление идеями

Данный раздел включает ряд утверждений, которые относятся к управлению идеями в Вашей организации.

Если у меня есть идея по улучшению для моей компании, я хочу ею поделиться с моей компанией. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Выберите одно или несколько утверждений о внесении предложений и идей по улучшению, с которыми Вы согласны.:

- a. В моей организации есть специальный отдел, куда любой сотрудник может внести свои идеи и предложения
- b. Я знаю, к кому конкретно можно обратиться, если у меня есть предложения
- c. Я должен вносить идеи и предложения через моего непосредственного начальника
- d. Я могу внести предложения и идеи анонимно
- e. Оценку внесенных идей и предложений проводит специальный комитет
- f. Оценку внесенных идей и предложений проводит один человек
- g. Свой вариант

В нашей компании идеи и предложения оцениваются прозрачно и честно. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Наша компания открыто и с легкостью принимает идеи и предложения от сотрудников. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Наша компания имеет систему поощрения для сотрудников, чьи идеи были оценены положительно и приняты в разработку. да/нет

Как компания мотивирует сотрудников вносить идеи и предложения по улучшению?? (несколько вариантов из списка)

- a. Денежное вознаграждение
- b. Публичное признание высшим руководством компании
- c. Организовывает конкурсы на лучшие идеи
- d. Никак не мотивирует
- e. Свой вариант

Лично для меня система поощрений в компании является очень мотивирующей и вдохновляющей. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Как можно улучшить систему мотивации и поощрения в компании? (открытый вопрос)

Выберите одно или несколько утверждений, с которыми Вы согласны.:

- a. Я хочу, чтобы мои коллеги знали, что я подал новую идею или предложение для оценки
- b. Если мою идею приняли, я хочу, чтобы мои коллеги знали, что именно я являюсь автором этой идеи
- c. Если мою идею отклонили, я хочу, чтобы мои коллеги не знали, что именно я являюсь автором этой идеи
- d. Я подавал идеи и предложения по улучшению в прошлом
- e. Я никогда не подавал идеи и предложения по улучшению в прошлом
- f. Я планирую подать идеи и предложения по улучшению в будущем
- g. Я не планирую подавать идеи и предложения по улучшению в будущем
- h. Свой вариант

Я считаю, что анонимное внесение идей и предложений является более честным независимо от того, примут или отклонят идею. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Я считаю, что наша компания старается мотивировать своих сотрудников к нестандартному и творческому мышлению. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Я считаю, что в нашей компании атмосфера, мотивирующая сотрудников к творческому подходу и генерации идей. Полностью не согласен, не согласен, скорее не согласен, чем согласен, скорее согласен, чем не согласен, согласен, полностью согласен

Спасибо за ответы!

Вы завершили анкету! Ваши честные ответы внесут большой вклад в проводимое исследование и формирование предложений для улучшений системы управления знаниями в Вашей компании!

BI Group – Knowledge Management
Anonymous Questionnaire

Section 1. Background Information

This section includes questions for gathering the general background information needed to gain statistics about respondents.

Before you start...

This questionnaire is anonymous and aims to gather data for analysis of the current situation knowledge management within the company and to assess what kind of improvements and innovation are more likely to be adopted in order to maintain qualitative development of the company.

The questionnaire consists of 5 sections and is going to take no more than 15 minutes. In the questionnaire there are few types of questions:

- 1) The statements – you should choose the degree of how much you can relate to the given statement; such type of questions prevails;*
- 2) Multiple choice questions – you should choose 1 or more options you can relate on or propose your own option;*
- 3) Open questions – you are asked to express all your ideas.*

We hope that you will be answering honestly as after the analysis of your answers we will define the big picture of the current status and propose the possible ways of development for increased efficiency of the work of you company!

Please, indicate your age: under 20, 20-29, 30-39, 40-49, 50 or older

Gender: Male, Female, Prefer not to mention

Origin: Astana, Almaty, Akmola region, Aktobe region, Almaty region, Atyrau region, West Kazakhstan region, Zhambyl region, Karaganda region, Kostanay region, Kyzylorda region, Mangystau region, South Kazakhstan region, Pavlodar region, North Kazakhstan region, East Kazakhstan region, Own response

Education level: School (9 classes), School (11 classes), Secondary professional education, Bachelor degree, Specialist degree, Master degree, PhD

Please, specify any additional information about your level of education (e.g., the title of the educational organization, graduation year, major, etc.) (*not obligatory*)

Experience: ____ years

Working in BI Group for ____ years

Please specify your current job position (e.g., department director, head of division, specialist, etc.)

In which holding you are working? BI GROUP CONSTRUCTION, BI GROUP DEVELOPMENT, BI GROUP ENGINEERING, Own response

Section 2. What I know about knowledge Management?

Knowledge Management (KM) is the process of creating, sharing, using and managing the knowledge and information of an organization. It refers to a multidisciplinary approach to achieving organisational objectives by making the best use of knowledge. (Wikipedia).

This section includes several statements which relate to knowledge management and to what it could mean to yourself. You shall assess your own level of relation towards the statements.

I was familiar with the term 'knowledge management' before. Yes, No, Own response

I believe that knowledge is my biggest asset I am providing to my employing organization. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

Mentoring: please, select one or more statements on which you agree.

- a. When I first came to this job my company assigned a mentor to me.
- b. This mentor easily made a connection with me
- c. This mentor was willing to help me/guide me/answer my questions
- d. This mentor is still assigned to me
- e. I have a different mentor now
- f. I don't have an assigned mentor anymore
- g. I feel that I still need the mentor.
- h. Own response

Please, select one or more appropriate statements. If I do not know something related to my job, I will most likely prefer:

- a. To reach out to my colleague who is assigned to help me with work-related questions
- b. To reach out to other colleague who is not assigned to help me with work-related questions
- c. To try to find an answer on my own (e.g., in internet, in documentation, related sources, etc.)
- d. To try to solve the question by myself through trial and error

If I need any information from my colleagues, they are willing to help me out. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

If I need any information required to fulfil my job duties, I know to whom I ought to address. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

My colleagues often approach me to ask if they do not know something related to the work. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I feel like my knowledge is appreciated. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I believe that my level of knowledge is sufficient to fulfil my job duties. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I know what areas of knowledge required for my job duties require from me more education/work/training. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I am willing to study more to explore knowledge not related to my job duties. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

If I need to find something on internet I search for sources in this language: Kazakh, Russian, English, Own response (*multiple choice*)

I believe that when searching online there is more reliable information in English. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I know how my company can help me to broaden my knowledge. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

Please, select statements on which you can relate, and in case you would like to do it please add your own comment/suggestions about how your employing organization cares about your personal growth and knowledge/competence development:

- a. I have studied in our Corporate University before
- b. I am studying in our Corporate University now
- c. I want to study in our Corporate University in the future
- d. My employing organization created a personal development plan for me
- e. My employing organization creates an education plan for each employee
- f. Own response

If you participated in education programs organized by your employing organization, please, indicate how many times. It could be workshops, trainings, career enhancement courses, master programs, etc. (*open question*)

Section 3. Knowledge Management in my employing organization

This section includes some statements related to knowledge management in your organization.

My employing organization has a team/department responsible for KM in our company. If yes, please indicate what is its title. (*open question*)

My employing organization has special trainings for newcomers on the topic of KM. (*single choice question*)

- d. All newcomers mandatorily
- e. Some newcomers
- f. Nobody has such training

My organization implemented a special database for storage of the knowledge created by the employees of the company. Y/N

My employing organization gives equal opportunities for personal growth through education for all its employees. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I feel like my employing organization cares about employees who have special knowledge and skills. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I believe that my company organizes the work in such a way so it would be clear to the employees where and from who they can get the information required to the work. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

My employing organization has implemented formal and informal channels of information distribution. Y/N

If the last answer was 'yes', please, specify: (*multiple choice question*)

- a. Company's database
- b. Company's website
- c. Instant messengers (e.g., WhatsApp)
- d. Online tele- and video-conference means (e.g., Skype)
- e. Social networks (e.g., Facebook, VK.com)
- f. Printed issues (journals, booklets, etc.)
- g. E-mail digests
- h. Own response

If the last answer was 'yes', please, indicate which ones you personally use: (*multiple choice question*)

- a. Company's database
- b. Company's website
- c. Instant messengers (e.g., WhatsApp)
- d. Online tele- and video-conference means (e.g., Skype)
- e. Social networks (e.g., Facebook, VK.com)
- f. Printed issues (journals, booklets, etc.)
- g. E-mail digests
- h. Own response

Which channels which are not implemented by the company yet you would like to implement additionally? (*open question*)

I believe that my company emphasizes to the employees the importance of self-studying. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I believe that higher level employees know more than I do. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I believe that my employing organization has right people in right place in terms of their level of knowledge, skills, abilities and potential. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

My employing organization has a reward and recognition systems for sharing knowledge with other employees. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

Section 4. Information formalization

This section includes some statements related to the process of extracting and formalization of knowledge in your organization.

I write reports: (*multiple choice question*)

- a. on the timely basis weekly
- b. on the timely basis monthly
- c. after finishing a certain event/project phase
- d. Own response

Only my manager gets to see my reports. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I get work tasks only from one clearly defined person. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

My work is controlled and monitored only one clearly defined person. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

Do you have to attend meetings? If yes, how often per month? (*open question*)

Please, select one or more statements you can relate to: (*multiple choice question*)

- a. All information I need to get from my colleagues to fulfil my job duties is provided on time
- b. All information I need to get from my colleagues is provided without any reminders from my side
- c. In order to get the information I need to fulfil my job duties I have to put very much efforts
- d. My requests for information from my colleagues are being ignored

- e. My requests for information from my colleagues are being rejected
- f. Some of my colleagues create obstacles to continuous information flow within the company
- g. I am not willing to fulfil information requests from some of my colleagues due to personal reasons
- h. I am getting too many requests for information from my colleagues
- i. Requests for information from my colleagues distract me from the work
- j. Own response

How could the information flow in your company be improved? (*open question*)

Section 5. Idea Management

This section includes some statements related to the idea management in your organization.

If I have an idea on improvements in my company I am willing to share them with my company. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

Select one or more statements about submission of propositions and ideas for improvements that you agree on:

- a. My organization has a special department where any employee can submit an idea
- b. I know to whom exactly I can address if I have suggestions
- c. I have to submit my ideas and propositions through my direct manager
- d. I can submit my propositions and ideas anonymously
- e. The submitted ideas and propositions are assessed by a special committee
- f. The submitted ideas and propositions are assessed by a single person
- g. Own response

In our company the ideas and propositions are considered in a transparent and fair manner. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

Our company accepts ideas and propositions coming from its employees openly and easily. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

Our company has a reward system for employees whose ideas were positively assessed and proceeded. Y/N

How does the company motivate the employees to submit the ideas and propositions for improvements? (*multiple choice question*)

- a. Money reward
- b. Public recognition by the top-management
- c. Organization of contests for best ideas
- d. It is not motivating anyhow
- e. Own response

For me personally the reward system in the company is very motivating and inspiring. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

How the motivation and reward system in the company can be improved? (*open question*)

Please, select one or more statements that you agree on:

- a. I want my colleagues to know that I've submitted new idea or proposition for assessment
- b. If my idea is accepted I want my colleagues to know that I was the author of this idea
- c. If my idea is rejected I don't want any of my colleagues to know that I was the author of this idea
- d. I've submitted ideas and propositions for improvement in the past
- e. I've never submitted ideas and propositions for improvement in the past
- f. I am planning to submit ideas and propositions for improvement in the future
- g. I am not planning to submit ideas and propositions for improvement in the future
- h. Own response

I believe that keeping the name of a person who submitted an idea confidential is a more fair approach regardless of acceptance or rejection of this idea. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I believe that my employing organization is trying to motivate its employees to be creative and think out of the box. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

I believe that my employing organization has environment cultivating creative thinking and idea generation. Strongly disagree, Disagree, Rather disagree than agree, Rather agree than disagree, Agree, Strongly agree

Thank you for responses!

You have finished the questionnaire! Your honest answers will contribute to the conducted research and elaborating suggestions for improvement of the knowledge management system in our company!

Case No.	Phase	Sub-phase	Activity	Start	End	Responsible	Priority	Status	Comments	Dependencies	Resources	Cost	Risk	Impact	Notes
1	Phase 1	Sub-phase 1	Activity 1	2023-01-01	2023-01-31	John Doe	High	Completed	Activity 1 completed successfully.	None	1 person	\$10,000	Low	High	Activity 1 completed successfully.
2	Phase 1	Sub-phase 1	Activity 2	2023-02-01	2023-02-28	Jane Smith	Medium	In Progress	Activity 2 is currently in progress.	Activity 1	2 people	\$20,000	Medium	Medium	Activity 2 is currently in progress.
3	Phase 1	Sub-phase 1	Activity 3	2023-03-01	2023-03-31	Mike Johnson	Low	Not Started	Activity 3 has not yet started.	Activity 2	1 person	\$5,000	Low	Low	Activity 3 has not yet started.
4	Phase 1	Sub-phase 2	Activity 4	2023-04-01	2023-04-30	Sarah Lee	High	Completed	Activity 4 completed successfully.	Activity 3	2 people	\$15,000	Low	High	Activity 4 completed successfully.
5	Phase 1	Sub-phase 2	Activity 5	2023-05-01	2023-05-31	David Kim	Medium	In Progress	Activity 5 is currently in progress.	Activity 4	1 person	\$10,000	Medium	Medium	Activity 5 is currently in progress.
6	Phase 1	Sub-phase 2	Activity 6	2023-06-01	2023-06-30	Emily White	Low	Not Started	Activity 6 has not yet started.	Activity 5	2 people	\$20,000	Low	Low	Activity 6 has not yet started.
7	Phase 1	Sub-phase 3	Activity 7	2023-07-01	2023-07-31	Chris Brown	High	Completed	Activity 7 completed successfully.	Activity 6	1 person	\$5,000	Low	High	Activity 7 completed successfully.
8	Phase 1	Sub-phase 3	Activity 8	2023-08-01	2023-08-31	Alex Green	Medium	In Progress	Activity 8 is currently in progress.	Activity 7	2 people	\$15,000	Medium	Medium	Activity 8 is currently in progress.
9	Phase 1	Sub-phase 3	Activity 9	2023-09-01	2023-09-30	Mia Black	Low	Not Started	Activity 9 has not yet started.	Activity 8	1 person	\$10,000	Low	Low	Activity 9 has not yet started.
10	Phase 1	Sub-phase 4	Activity 10	2023-10-01	2023-10-31	Noah Grey	High	Completed	Activity 10 completed successfully.	Activity 9	2 people	\$20,000	Low	High	Activity 10 completed successfully.
11	Phase 1	Sub-phase 4	Activity 11	2023-11-01	2023-11-30	Liam Blue	Medium	In Progress	Activity 11 is currently in progress.	Activity 10	1 person	\$10,000	Medium	Medium	Activity 11 is currently in progress.
12	Phase 1	Sub-phase 4	Activity 12	2023-12-01	2023-12-31	Olivia Purple	Low	Not Started	Activity 12 has not yet started.	Activity 11	2 people	\$20,000	Low	Low	Activity 12 has not yet started.
13	Phase 2	Sub-phase 1	Activity 13	2024-01-01	2024-01-31	Ethan Yellow	High	Completed	Activity 13 completed successfully.	Activity 12	1 person	\$5,000	Low	High	Activity 13 completed successfully.
14	Phase 2	Sub-phase 1	Activity 14	2024-02-01	2024-02-28	Ava Orange	Medium	In Progress	Activity 14 is currently in progress.	Activity 13	2 people	\$15,000	Medium	Medium	Activity 14 is currently in progress.
15	Phase 2	Sub-phase 1	Activity 15	2024-03-01	2024-03-31	Lucas Green	Low	Not Started	Activity 15 has not yet started.	Activity 14	1 person	\$10,000	Low	Low	Activity 15 has not yet started.
16	Phase 2	Sub-phase 2	Activity 16	2024-04-01	2024-04-30	Sophia Blue	High	Completed	Activity 16 completed successfully.	Activity 15	2 people	\$20,000	Low	High	Activity 16 completed successfully.
17	Phase 2	Sub-phase 2	Activity 17	2024-05-01	2024-05-31	Mason Purple	Medium	In Progress	Activity 17 is currently in progress.	Activity 16	1 person	\$10,000	Medium	Medium	Activity 17 is currently in progress.
18	Phase 2	Sub-phase 2	Activity 18	2024-06-01	2024-06-30	Isabella Yellow	Low	Not Started	Activity 18 has not yet started.	Activity 17	2 people	\$20,000	Low	Low	Activity 18 has not yet started.
19	Phase 2	Sub-phase 3	Activity 19	2024-07-01	2024-07-31	James Orange	High	Completed	Activity 19 completed successfully.	Activity 18	1 person	\$5,000	Low	High	Activity 19 completed successfully.
20	Phase 2	Sub-phase 3	Activity 20	2024-08-01	2024-08-31	Charlotte Green	Medium	In Progress	Activity 20 is currently in progress.	Activity 19	2 people	\$15,000	Medium	Medium	Activity 20 is currently in progress.
21	Phase 2	Sub-phase 3	Activity 21	2024-09-01	2024-09-30	Benjamin Blue	Low	Not Started	Activity 21 has not yet started.	Activity 20	1 person	\$10,000	Low	Low	Activity 21 has not yet started.
22	Phase 2	Sub-phase 4	Activity 22	2024-10-01	2024-10-31	Abigail Purple	High	Completed	Activity 22 completed successfully.	Activity 21	2 people	\$20,000	Low	High	Activity 22 completed successfully.
23	Phase 2	Sub-phase 4	Activity 23	2024-11-01	2024-11-30	Elijah Yellow	Medium	In Progress	Activity 23 is currently in progress.	Activity 22	1 person	\$10,000	Medium	Medium	Activity 23 is currently in progress.
24	Phase 2	Sub-phase 4	Activity 24	2024-12-01	2024-12-31	Madison Orange	Low	Not Started	Activity 24 has not yet started.	Activity 23	2 people	\$20,000	Low	Low	Activity 24 has not yet started.

Row ID	Phase	Phase Name	Start Date	End Date	Project Name	Project Manager	Project Sponsor	Project Status	Project Description	Project Objectives	Project Risks	Project Challenges	Project Success Factors	Project Lessons Learned	Project Best Practices	Project Key Deliverables	Project Milestones	Project Budget	Project Resources	Project Stakeholders	Project Communication	Project Reporting	Project Evaluation	Project Review	Project Archiving
1	Initiation	Phase 1: Initiation	2023-01-01	2023-01-31	Project A	John Doe	Jane Smith	On Track	Project A: Phase 1: Initiation	Define project goals and objectives.	Identify project stakeholders.	Obtain project authorization.	Establish project governance.	Develop project charter.	Secure project resources.	Project Charter	2023-01-15	\$100,000	5 team members	Project Sponsor, Stakeholders	Weekly status reports.	Monthly progress reports.	Quarterly reviews.	Final project review.	Project archive.
2	Planning	Phase 2: Planning	2023-02-01	2023-02-28	Project A	John Doe	Jane Smith	On Track	Project A: Phase 2: Planning	Develop project management plan.	Identify project risks.	Develop risk management plan.	Develop communication management plan.	Develop stakeholder management plan.	Develop resource management plan.	Project Management Plan	2023-02-15	\$200,000	10 team members	Project Sponsor, Stakeholders	Weekly status reports.	Monthly progress reports.	Quarterly reviews.	Final project review.	Project archive.
3	Execution	Phase 3: Execution	2023-03-01	2023-03-31	Project A	John Doe	Jane Smith	On Track	Project A: Phase 3: Execution	Execute project management plan.	Monitor project progress.	Manage project risks.	Manage project communication.	Manage project stakeholder engagement.	Manage project resources.	Project Deliverables	2023-03-15	\$300,000	15 team members	Project Sponsor, Stakeholders	Weekly status reports.	Monthly progress reports.	Quarterly reviews.	Final project review.	Project archive.
4	Closing	Phase 4: Closing	2023-04-01	2023-04-30	Project A	John Doe	Jane Smith	Completed	Project A: Phase 4: Closing	Finalize project deliverables.	Obtain project closure approval.	Archive project information.	Conduct project retrospective.	Release project resources.	Project Closure Report	2023-04-15	\$100,000	5 team members	Project Sponsor, Stakeholders	Weekly status reports.	Monthly progress reports.	Quarterly reviews.	Final project review.	Project archive.	

Case No.	Phase	Sub-phase	Region	Country	Sub-country	Project Name	Start Date	End Date	Project Status	Project Type	Project Lead	Project Manager	Project Sponsor	Project Stakeholders	Project Objectives	Project Results	Project Impact	Project Lessons Learned	Project Risks	Project Challenges	Project Opportunities	Project Recommendations	Project Next Steps	Project Review Date	Project Review Status	Project Reviewer	Project Review Comments	Project Review Date	Project Review Status	Project Reviewer	Project Review Comments
101	Phase 1	Sub-phase 1	Region 1	Country 1	Sub-country 1	Project Name 1	2020-01-01	2020-12-31	Completed	Construction	John Doe	Jane Smith	John Doe	John Doe, Jane Smith, Bob Johnson	Build a new road	Completed	Improved road quality	Reduced travel time	Cost overruns	Weather delays	Local community support	None	None	2021-03-15	Completed	John Doe	Project completed on time and within budget.	2021-03-15	Completed	John Doe	Project completed on time and within budget.
102	Phase 2	Sub-phase 2	Region 2	Country 2	Sub-country 2	Project Name 2	2021-01-01	2021-12-31	In Progress	Construction	John Doe	Jane Smith	John Doe	John Doe, Jane Smith, Bob Johnson	Build a new bridge	In Progress	Bridge under construction	Delays in material supply	Weather delays	Local community support	None	None	2021-06-15	In Progress	John Doe	Project is progressing well, but facing some delays.	2021-06-15	In Progress	John Doe	Project is progressing well, but facing some delays.	
103	Phase 3	Sub-phase 3	Region 3	Country 3	Sub-country 3	Project Name 3	2022-01-01	2022-12-31	Not Started	Construction	John Doe	Jane Smith	John Doe	John Doe, Jane Smith, Bob Johnson	Build a new school	Not Started	Site preparation	None	None	Local community support	None	None	2022-03-15	Not Started	John Doe	Project is in the planning stage.	2022-03-15	Not Started	John Doe	Project is in the planning stage.	

Case No.	Phase	Sub-phase	Region	Sub-region	Sub-sub-region	Project Name	Project ID	Project Type	Project Status	Project Description	Project Start	Project End	Project Manager	Project Sponsor	Project Stakeholders	Project Risks	Project Challenges	Project Success Factors	Project Lessons Learned	Project Impact	Project Evaluation	Project Review	Project Follow-up	Project Archiving
101	Phase 1	Sub-phase 1.1	Region A	Sub-region A.1	Sub-sub-region A.1.1	Project Name 1	PROJ-001	Construction	Completed	Project Description 1	2020-01-01	2020-12-31	Manager 1	Sponsor 1	Stakeholders 1	Risks 1	Challenges 1	Success Factors 1	Lessons Learned 1	Impact 1	Evaluation 1	Review 1	Archiving 1	
102	Phase 1	Sub-phase 1.2	Region A	Sub-region A.2	Sub-sub-region A.2.1	Project Name 2	PROJ-002	Construction	In Progress	Project Description 2	2021-01-01	2021-12-31	Manager 2	Sponsor 2	Stakeholders 2	Risks 2	Challenges 2	Success Factors 2	Lessons Learned 2	Impact 2	Evaluation 2	Review 2	Archiving 2	
103	Phase 1	Sub-phase 1.3	Region A	Sub-region A.3	Sub-sub-region A.3.1	Project Name 3	PROJ-003	Construction	On Hold	Project Description 3	2022-01-01	2022-12-31	Manager 3	Sponsor 3	Stakeholders 3	Risks 3	Challenges 3	Success Factors 3	Lessons Learned 3	Impact 3	Evaluation 3	Review 3	Archiving 3	
104	Phase 1	Sub-phase 1.4	Region A	Sub-region A.4	Sub-sub-region A.4.1	Project Name 4	PROJ-004	Construction	Completed	Project Description 4	2023-01-01	2023-12-31	Manager 4	Sponsor 4	Stakeholders 4	Risks 4	Challenges 4	Success Factors 4	Lessons Learned 4	Impact 4	Evaluation 4	Review 4	Archiving 4	
105	Phase 1	Sub-phase 1.5	Region A	Sub-region A.5	Sub-sub-region A.5.1	Project Name 5	PROJ-005	Construction	In Progress	Project Description 5	2024-01-01	2024-12-31	Manager 5	Sponsor 5	Stakeholders 5	Risks 5	Challenges 5	Success Factors 5	Lessons Learned 5	Impact 5	Evaluation 5	Review 5	Archiving 5	
106	Phase 1	Sub-phase 1.6	Region A	Sub-region A.6	Sub-sub-region A.6.1	Project Name 6	PROJ-006	Construction	On Hold	Project Description 6	2025-01-01	2025-12-31	Manager 6	Sponsor 6	Stakeholders 6	Risks 6	Challenges 6	Success Factors 6	Lessons Learned 6	Impact 6	Evaluation 6	Review 6	Archiving 6	
107	Phase 1	Sub-phase 1.7	Region A	Sub-region A.7	Sub-sub-region A.7.1	Project Name 7	PROJ-007	Construction	Completed	Project Description 7	2026-01-01	2026-12-31	Manager 7	Sponsor 7	Stakeholders 7	Risks 7	Challenges 7	Success Factors 7	Lessons Learned 7	Impact 7	Evaluation 7	Review 7	Archiving 7	
108	Phase 1	Sub-phase 1.8	Region A	Sub-region A.8	Sub-sub-region A.8.1	Project Name 8	PROJ-008	Construction	In Progress	Project Description 8	2027-01-01	2027-12-31	Manager 8	Sponsor 8	Stakeholders 8	Risks 8	Challenges 8	Success Factors 8	Lessons Learned 8	Impact 8	Evaluation 8	Review 8	Archiving 8	
109	Phase 1	Sub-phase 1.9	Region A	Sub-region A.9	Sub-sub-region A.9.1	Project Name 9	PROJ-009	Construction	On Hold	Project Description 9	2028-01-01	2028-12-31	Manager 9	Sponsor 9	Stakeholders 9	Risks 9	Challenges 9	Success Factors 9	Lessons Learned 9	Impact 9	Evaluation 9	Review 9	Archiving 9	
110	Phase 1	Sub-phase 1.10	Region A	Sub-region A.10	Sub-sub-region A.10.1	Project Name 10	PROJ-010	Construction	Completed	Project Description 10	2029-01-01	2029-12-31	Manager 10	Sponsor 10	Stakeholders 10	Risks 10	Challenges 10	Success Factors 10	Lessons Learned 10	Impact 10	Evaluation 10	Review 10	Archiving 10	
111	Phase 1	Sub-phase 1.11	Region A	Sub-region A.11	Sub-sub-region A.11.1	Project Name 11	PROJ-011	Construction	In Progress	Project Description 11	2030-01-01	2030-12-31	Manager 11	Sponsor 11	Stakeholders 11	Risks 11	Challenges 11	Success Factors 11	Lessons Learned 11	Impact 11	Evaluation 11	Review 11	Archiving 11	
112	Phase 1	Sub-phase 1.12	Region A	Sub-region A.12	Sub-sub-region A.12.1	Project Name 12	PROJ-012	Construction	On Hold	Project Description 12	2031-01-01	2031-12-31	Manager 12	Sponsor 12	Stakeholders 12	Risks 12	Challenges 12	Success Factors 12	Lessons Learned 12	Impact 12	Evaluation 12	Review 12	Archiving 12	
113	Phase 1	Sub-phase 1.13	Region A	Sub-region A.13	Sub-sub-region A.13.1	Project Name 13	PROJ-013	Construction	Completed	Project Description 13	2032-01-01	2032-12-31	Manager 13	Sponsor 13	Stakeholders 13	Risks 13	Challenges 13	Success Factors 13	Lessons Learned 13	Impact 13	Evaluation 13	Review 13	Archiving 13	
114	Phase 1	Sub-phase 1.14	Region A	Sub-region A.14	Sub-sub-region A.14.1	Project Name 14	PROJ-014	Construction	In Progress	Project Description 14	2033-01-01	2033-12-31	Manager 14	Sponsor 14	Stakeholders 14	Risks 14	Challenges 14	Success Factors 14	Lessons Learned 14	Impact 14	Evaluation 14	Review 14	Archiving 14	
115	Phase 1	Sub-phase 1.15	Region A	Sub-region A.15	Sub-sub-region A.15.1	Project Name 15	PROJ-015	Construction	On Hold	Project Description 15	2034-01-01	2034-12-31	Manager 15	Sponsor 15	Stakeholders 15	Risks 15	Challenges 15	Success Factors 15	Lessons Learned 15	Impact 15	Evaluation 15	Review 15	Archiving 15	
116	Phase 1	Sub-phase 1.16	Region A	Sub-region A.16	Sub-sub-region A.16.1	Project Name 16	PROJ-016	Construction	Completed	Project Description 16	2035-01-01	2035-12-31	Manager 16	Sponsor 16	Stakeholders 16	Risks 16	Challenges 16	Success Factors 16	Lessons Learned 16	Impact 16	Evaluation 16	Review 16	Archiving 16	
117	Phase 1	Sub-phase 1.17	Region A	Sub-region A.17	Sub-sub-region A.17.1	Project Name 17	PROJ-017	Construction	In Progress	Project Description 17	2036-01-01	2036-12-31	Manager 17	Sponsor 17	Stakeholders 17	Risks 17	Challenges 17	Success Factors 17	Lessons Learned 17	Impact 17	Evaluation 17	Review 17	Archiving 17	
118	Phase 1	Sub-phase 1.18	Region A	Sub-region A.18	Sub-sub-region A.18.1	Project Name 18	PROJ-018	Construction	On Hold	Project Description 18	2037-01-01	2037-12-31	Manager 18	Sponsor 18	Stakeholders 18	Risks 18	Challenges 18	Success Factors 18	Lessons Learned 18	Impact 18	Evaluation 18	Review 18	Archiving 18	
119	Phase 1	Sub-phase 1.19	Region A	Sub-region A.19	Sub-sub-region A.19.1	Project Name 19	PROJ-019	Construction	Completed	Project Description 19	2038-01-01	2038-12-31	Manager 19	Sponsor 19	Stakeholders 19	Risks 19	Challenges 19	Success Factors 19	Lessons Learned 19	Impact 19	Evaluation 19	Review 19	Archiving 19	
120	Phase 1	Sub-phase 1.20	Region A	Sub-region A.20	Sub-sub-region A.20.1	Project Name 20	PROJ-020	Construction	In Progress	Project Description 20	2039-01-01	2039-12-31	Manager 20	Sponsor 20	Stakeholders 20	Risks 20	Challenges 20	Success Factors 20	Lessons Learned 20	Impact 20	Evaluation 20	Review 20	Archiving 20	

Item No.	Item Name	Item Description	Item Code	Item Unit	Item Quantity	Item Price	Item Total	Item Tax	Item Net Total	Item Status	Item Location	Item Date	Item Time	Item User	Item Action	Item Comment	Item Detail	Item Note	Item Remark	Item Remark2	Item Remark3	Item Remark4	Item Remark5	Item Remark6	Item Remark7	Item Remark8	Item Remark9	Item Remark10	Item Remark11	Item Remark12	Item Remark13	Item Remark14	Item Remark15	Item Remark16	Item Remark17	Item Remark18	Item Remark19	Item Remark20
1

Case No.	Case Name	Case Type	Case Status	Case Description	Case Category	Case Sub-Category	Case Priority	Case Assigned To	Case Assigned Date	Case Assigned Time	Case Assigned User	Case Assigned Role	Case Assigned Org	Case Assigned Dept	Case Assigned Team	Case Assigned Manager	Case Assigned Location	Case Assigned Country	Case Assigned Region	Case Assigned City	Case Assigned State	Case Assigned Zip	Case Assigned Phone	Case Assigned Email	Case Assigned Website	Case Assigned Social	Case Assigned Other	Case Assigned Notes	Case Assigned Comments	Case Assigned Attachments	Case Assigned Links	Case Assigned Tags	Case Assigned Keywords	Case Assigned Keywords2	Case Assigned Keywords3	Case Assigned Keywords4	Case Assigned Keywords5	Case Assigned Keywords6	Case Assigned Keywords7	Case Assigned Keywords8	Case Assigned Keywords9	Case Assigned Keywords10	Case Assigned Keywords11	Case Assigned Keywords12	Case Assigned Keywords13	Case Assigned Keywords14	Case Assigned Keywords15	Case Assigned Keywords16	Case Assigned Keywords17	Case Assigned Keywords18	Case Assigned Keywords19	Case Assigned Keywords20	Case Assigned Keywords21	Case Assigned Keywords22	Case Assigned Keywords23	Case Assigned Keywords24	Case Assigned Keywords25	Case Assigned Keywords26	Case Assigned Keywords27	Case Assigned Keywords28	Case Assigned Keywords29	Case Assigned Keywords30	Case Assigned Keywords31	Case Assigned Keywords32	Case Assigned Keywords33	Case Assigned Keywords34	Case Assigned Keywords35	Case Assigned Keywords36	Case Assigned Keywords37	Case Assigned Keywords38	Case Assigned Keywords39	Case Assigned Keywords40	Case Assigned Keywords41	Case Assigned Keywords42	Case Assigned Keywords43	Case Assigned Keywords44	Case Assigned Keywords45	Case Assigned Keywords46	Case Assigned Keywords47	Case Assigned Keywords48	Case Assigned Keywords49	Case Assigned Keywords50	Case Assigned Keywords51	Case Assigned Keywords52	Case Assigned Keywords53	Case Assigned Keywords54	Case Assigned Keywords55	Case Assigned Keywords56	Case Assigned Keywords57	Case Assigned Keywords58	Case Assigned Keywords59	Case Assigned Keywords60	Case Assigned Keywords61	Case Assigned Keywords62	Case Assigned Keywords63	Case Assigned Keywords64	Case Assigned Keywords65	Case Assigned Keywords66	Case Assigned Keywords67	Case Assigned Keywords68	Case Assigned Keywords69	Case Assigned Keywords70	Case Assigned Keywords71	Case Assigned Keywords72	Case Assigned Keywords73	Case Assigned Keywords74	Case Assigned Keywords75	Case Assigned Keywords76	Case Assigned Keywords77	Case Assigned Keywords78	Case Assigned Keywords79	Case Assigned Keywords80	Case Assigned Keywords81	Case Assigned Keywords82	Case Assigned Keywords83	Case Assigned Keywords84	Case Assigned Keywords85	Case Assigned Keywords86	Case Assigned Keywords87	Case Assigned Keywords88	Case Assigned Keywords89	Case Assigned Keywords90	Case Assigned Keywords91	Case Assigned Keywords92	Case Assigned Keywords93	Case Assigned Keywords94	Case Assigned Keywords95	Case Assigned Keywords96	Case Assigned Keywords97	Case Assigned Keywords98	Case Assigned Keywords99	Case Assigned Keywords100
1	Case 1	Case Type 1	Case Status 1	Case Description 1	Case Category 1	Case Sub-Category 1	Case Priority 1	Case Assigned To 1	Case Assigned Date 1	Case Assigned Time 1	Case Assigned User 1	Case Assigned Role 1	Case Assigned Org 1	Case Assigned Dept 1	Case Assigned Team 1	Case Assigned Manager 1	Case Assigned Location 1	Case Assigned Country 1	Case Assigned Region 1	Case Assigned City 1	Case Assigned State 1	Case Assigned Zip 1	Case Assigned Phone 1	Case Assigned Email 1	Case Assigned Website 1	Case Assigned Social 1	Case Assigned Other 1	Case Assigned Notes 1	Case Assigned Comments 1	Case Assigned Attachments 1	Case Assigned Links 1	Case Assigned Tags 1	Case Assigned Keywords 1	Case Assigned Keywords2 1	Case Assigned Keywords3 1	Case Assigned Keywords4 1	Case Assigned Keywords5 1	Case Assigned Keywords6 1	Case Assigned Keywords7 1	Case Assigned Keywords8 1	Case Assigned Keywords9 1	Case Assigned Keywords10 1	Case Assigned Keywords11 1	Case Assigned Keywords12 1	Case Assigned Keywords13 1	Case Assigned Keywords14 1	Case Assigned Keywords15 1	Case Assigned Keywords16 1	Case Assigned Keywords17 1	Case Assigned Keywords18 1	Case Assigned Keywords19 1	Case Assigned Keywords20 1	Case Assigned Keywords21 1	Case Assigned Keywords22 1	Case Assigned Keywords23 1	Case Assigned Keywords24 1	Case Assigned Keywords25 1	Case Assigned Keywords26 1	Case Assigned Keywords27 1	Case Assigned Keywords28 1	Case Assigned Keywords29 1	Case Assigned Keywords30 1	Case Assigned Keywords31 1	Case Assigned Keywords32 1	Case Assigned Keywords33 1	Case Assigned Keywords34 1	Case Assigned Keywords35 1	Case Assigned Keywords36 1	Case Assigned Keywords37 1	Case Assigned Keywords38 1	Case Assigned Keywords39 1	Case Assigned Keywords40 1	Case Assigned Keywords41 1	Case Assigned Keywords42 1	Case Assigned Keywords43 1	Case Assigned Keywords44 1	Case Assigned Keywords45 1	Case Assigned Keywords46 1	Case Assigned Keywords47 1	Case Assigned Keywords48 1	Case Assigned Keywords49 1	Case Assigned Keywords50 1	Case Assigned Keywords51 1	Case Assigned Keywords52 1	Case Assigned Keywords53 1	Case Assigned Keywords54 1	Case Assigned Keywords55 1	Case Assigned Keywords56 1	Case Assigned Keywords57 1	Case Assigned Keywords58 1	Case Assigned Keywords59 1	Case Assigned Keywords60 1	Case Assigned Keywords61 1	Case Assigned Keywords62 1	Case Assigned Keywords63 1	Case Assigned Keywords64 1	Case Assigned Keywords65 1	Case Assigned Keywords66 1	Case Assigned Keywords67 1	Case Assigned Keywords68 1	Case Assigned Keywords69 1	Case Assigned Keywords70 1	Case Assigned Keywords71 1	Case Assigned Keywords72 1	Case Assigned Keywords73 1	Case Assigned Keywords74 1	Case Assigned Keywords75 1	Case Assigned Keywords76 1	Case Assigned Keywords77 1	Case Assigned Keywords78 1	Case Assigned Keywords79 1	Case Assigned Keywords80 1	Case Assigned Keywords81 1	Case Assigned Keywords82 1	Case Assigned Keywords83 1	Case Assigned Keywords84 1	Case Assigned Keywords85 1	Case Assigned Keywords86 1	Case Assigned Keywords87 1	Case Assigned Keywords88 1	Case Assigned Keywords89 1	Case Assigned Keywords90 1	Case Assigned Keywords91 1	Case Assigned Keywords92 1	Case Assigned Keywords93 1	Case Assigned Keywords94 1	Case Assigned Keywords95 1	Case Assigned Keywords96 1	Case Assigned Keywords97 1	Case Assigned Keywords98 1	Case Assigned Keywords99 1	Case Assigned Keywords100 1

Case No.	Case Name	Case Type	Case Status	Case Description	Case Category	Case Sub-Category	Case Priority	Case Assigned To	Case Assigned Date	Case Assigned Time	Case Assigned User	Case Assigned Role	Case Assigned Org	Case Assigned Dept	Case Assigned Div	Case Assigned Team	Case Assigned Manager	Case Assigned Supervisor	Case Assigned Contact	Case Assigned Email	Case Assigned Phone	Case Assigned Address	Case Assigned City	Case Assigned State	Case Assigned Zip	Case Assigned Country	Case Assigned Language	Case Assigned Currency	Case Assigned Timezone	Case Assigned Calendar	Case Assigned Working Hours	Case Assigned Vacation	Case Assigned Sick Leave	Case Assigned PTO	Case Assigned Other	Case Assigned Notes	Case Assigned Attachments	Case Assigned Comments	Case Assigned History	Case Assigned Audit	Case Assigned Security	Case Assigned Permissions	Case Assigned Roles	Case Assigned Groups	Case Assigned Users	Case Assigned Roles	Case Assigned Groups	Case Assigned Users
1	Case 1	Case Type 1	Case Status 1	Case Description 1	Case Category 1	Case Sub-Category 1	Case Priority 1	Case Assigned To 1	Case Assigned Date 1	Case Assigned Time 1	Case Assigned User 1	Case Assigned Role 1	Case Assigned Org 1	Case Assigned Dept 1	Case Assigned Div 1	Case Assigned Team 1	Case Assigned Manager 1	Case Assigned Supervisor 1	Case Assigned Contact 1	Case Assigned Email 1	Case Assigned Phone 1	Case Assigned Address 1	Case Assigned City 1	Case Assigned State 1	Case Assigned Zip 1	Case Assigned Country 1	Case Assigned Language 1	Case Assigned Currency 1	Case Assigned Timezone 1	Case Assigned Calendar 1	Case Assigned Working Hours 1	Case Assigned Vacation 1	Case Assigned Sick Leave 1	Case Assigned PTO 1	Case Assigned Other 1	Case Assigned Notes 1	Case Assigned Attachments 1	Case Assigned Comments 1	Case Assigned History 1	Case Assigned Audit 1	Case Assigned Security 1	Case Assigned Permissions 1	Case Assigned Roles 1	Case Assigned Groups 1	Case Assigned Users 1	Case Assigned Roles 1	Case Assigned Groups 1	Case Assigned Users 1

Статистические данные по сотрудникам BI Group

Распределение по функциям

Функция	Семейство должности	%
Controlling	СБ	2,8%
	БиОТ	2,4%
	СВА	0,2%
	Технический Надзор	1,0%
Executives	Директорат	2,2%
Methods of Business Devel	Lean / Контроль качества	0,7%
	Группа Project / Управление ведения проектов / BIPS	0,7%
	Технический отдел	0,6%
Production	Завод	2,9%
	Лаборатория	0,7%
	Линия	26,4%
	Механизация	23,9%
	ОИС	0,8%
Sales and PostSalesSuppor	ПТО	5,0%
	Департамент продаж / Контакт-центр	3,2%
	Сервисное Управление / ОГО	4,3%
	Управление развития / Отдел рекламы	0,8%
Support	HR	2,4%
	PR	0,3%
	АХО	3,8%
	Бухгалтерия и казначейство	5,0%
	Финансы	2,9%
	Информационные технологии	1,7%
	Коммерческий отдел/Закупки	2,7%
Юридический отдел	2,7%	
Общий итог		100,0%

Распределение по полу

Пол	%
Женский	24%
Мужской	76%

Распределение по возрасту

Возраст	%
младше 23 лет	6,30%
23-27 лет	22,40%
28-35 лет	27,40%
36-45 лет	20,00%
46-60 лет	21,50%
61 год и старше	2,40%

Распределение по образованию

Образование	%
Высшее профильное	65,55%
Высшее непрофильное	11,25%
Среднее профильное	15,74%
Среднее непрофильное	7,46%

Statistics on BI Group Employees

Functional Distribution

Function	Position Family	%
Controlling	C5	2,8%
	Safety and Labor Protection	2,4%
	Internal Audit	0,2%
	Technical Supervision	1,0%
Executives	Directorate	2,2%
Methods of Business Devel	Lean / QA	0,7%
	Project Group / Project Management / BIPS	0,7%
	Technical department	0,6%
Production	Plant	2,9%
	Lab	0,7%
	Line production	26,4%
	Mechanisation	23,9%
	Intellectual property department	0,8%
Sales and PostSalesSuppor	Production and Technical department	5,0%
	Sales department / Contact center	3,2%
	Service Department / After-sales service department	4,3%
	Development / Adveertising department	0,8%
Support	HR	2,4%
	PR	0,3%
	Administration and Maintenance Department	3,8%
	Accounting and Treasury	5,0%
	Finance	2,9%
	IT	1,7%
	Commerce/Purchase department	2,7%
Legal Department	2,7%	
Overall		100,0%

Distribution over gender

Gender	%
Female	24%
Male	76%

Distribution over age

Age	%
< 23	6,30%
23-27	22,40%
28-35	27,40%
36-45	20,00%
46-60	21,50%
61 and older	2,40%

Distribution over education level

Education level	%
Higher level industry major	65,55%
Higher level industry minor	11,25%
College industry major	15,74%
College industry minor	7,46%

ANNEX D – Codified answers matrix for CORREL analysis

	AGE	GENDER	EDU	EXP	BI EXP	DEV/CON/ENG	KM FAM	MY KN ASSET	MY KN APPREC	MY KN SUFF	STUDY MORE	KM DBASE	BI CARES	BI RECOGN	SHARE IDEA	FAIR TREAT	IDEA ACCEPT	IDEA MOTIV	INNO ENV
1	3	2	3	10	1	2	1	1	1	1	1	1	2	-1	1	1	1	-1	-1
2	3	2	3	10	5	2	1	0	1	0	2	1	0	0	1	0	0	2	1
3	3	1	2	17	7	1	1	2	0	2	2	0	2	1	2	-1	0	2	0
4	3	2	2	12	3	1	0	-2	1	1	1	1	1	1	1	1	1	1	1
5	2	2	3	3	3	2	1	0	0	1	1	0	1	0	1	1	1	1	1
6	2	1	2	5	2	1	1	1	1	1	0	1	0	0	1	1	1	0	1
7	3	2	2	10	7	1	1	2	1	-1	1	1	1	1	1	1	1	1	1
8	2	1	2	3	3	1	0	0	0	-1	1	0	0	0	2	0	0	1	1
9	3	2	3	16	5	2	0	1	1	1	1	1	2	1	1	0	0	-1	1
10	2	1	2	2	2	1	1	0	0	2	2	1	1	-2	1	0	0	1	1
11	3	1	2	7	4	1	0	1	1	2	1	1	2	1	1	2	2	1	2
12	3	1	3	18	1	3	0	1	0	0	2	1	1	-1	1	0	0	-1	0
13	2	1	3	1	1	1	0	2	2	1	1	0	1	0	1	1	1	1	1
14	2	1	3	7	5	1	1	2	1	1	2	0	0	0	1	1	0	1	1
15	3	2	2	11	1	1	0	0	1	1	0	1	1	1	1	1	1	1	1
16	4	2	1	22	1	1	0	0	1	1	1	0	-1	-1	1	0	0	-1	-1
17	2	1	2	9	3	1	0	1	1	2	1	0	1	-1	1	0	0	1	0
18	2	1	3	1	1	2	0	1	1	1	2	1	1	1	1	1	1	1	1
19	4	1	3	21	3	1	0	1	0	2	1	1	0	0	0	0	0	0	0
20	2	2	3	5	2	1	0	1	1	1	2	1	1	0	1	0	1	0	0
21	2	2	3	5	5	1	1	1	0	1	1	1	0	1	1	1	1	1	1
22	3	1	2	37	1	3	1	1	0	0	1	0	-1	-1	0	0	0	0	-1
23	2	2	3	1	1	1	0	1	0	1	1	0	1	-1	1	0	0	1	1
24	2	2	2	1	1	2	0	2	1	0	2	1	1	0	1	1	1	1	1
25	2	2	2	5	3	1	0	1	1	1	1	1	1	1	1	1	1	1	1
26	3	1	3	12	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1
27	2	1	2	7	1	1	0	2	1	1	1	1	1	1	1	1	1	1	1
28	3	2	2	14	2	1	1	1	1	1	1	1	1	-1	1	1	1	1	1
29	4	2	3	26	12	1	0	1	1	1	1	0	1	1	1	1	1	1	1
30	2	1	2	1	1	1	1	0	0	-1	1	1	2	1	1	1	1	2	0
31	2	1	2	6	4	1	0	1	1	2	0	0	1	0	1	0	1	0	0
32	2	1	2	4	2	1	0	1	1	1	1	1	0	1	1	1	1	1	1
33	2	1	2	4	1	1	1	-2	1	2	1	0	0	-1	0	0	0	0	0
34	2	2	2	1	1	2	1	1	1	2	2	1	2	1	1	1	1	0	0
35	4	2	3	25	1	2	1	2	2	2	0	1	1	-1	0	-1	-1	0	1
36	2	1	2	4	3	1	0	1	0	0	1	1	1	-1	0	0	1	1	0
37	3	1	2	11	3	1	0	2	2	2	2	1	2	2	2	2	2	2	2
38	2	1	2	7	1	1	1	-2	1	2	2	0	2	0	1	2	2	1	1
39	2	2	2	2	2	1	0	2	1	2	2	1	1	-1	1	1	1	0	1
40	2	1	1	6	1	2	1	1	1	1	0	0	0	-1	0	1	0	0	0
41	5	1	2	25	4	3	1	1	1	1	2	0	0	0	1	1	2	1	0
42	5	2	2	30	3	2	0	-2	-2	0	-2	0	0	0	0	0	0	0	0
43	4	1	2	22	0	3	1	2	2	2	2	1	2	2	0	2	2	0	2
44	2	2	2	5	3	2	1	0	0	0	1	0	0	1	0	0	0	1	1
45	2	1	2	5	1	2	1	1	1	1	2	1	2	1	0	0	0	0	1
46	4	1	2	20	1	1	0	1	0	1	1	1	1	-1	1	-1	-1	1	1
47	2	2	2	4	4	1	0	0	2	2	1	1	2	0	-1	2	2	0	0
48	2	2	3	4	2	1	1	1	1	2	2	0	0	0	0	0	0	0	0
49	2	1	4	9	1	1	1	1	1	2	1	0	0	-1	2	1	0	0	0
50	4	2	3	20	13	1	1	1	0	0	1	0	0	0	1	1	1	1	1
51	3	1	2	12	1	2	0	1	1	1	1	1	1	1	1	1	0	1	1
52	3	1	2	9	2	1	0	1	0	2	2	0	-2	-2	0	0	0	0	-1
53	4	2	2	17	4	3	1	1	0	0	0	1	0	0	0	0	0	0	0
54	2	2	2	7	1	1	0	0	0	0	1	1	1	1	1	1	1	1	1
55	5	1	2	30	11	1	0	0	1	0	1	1	1	1	1	1	0	1	1
56	2	2	3	1	1	1	0	1	0	0	0	0	1	1	-1	1	1	1	1

	AGE	GENDER	EDU	EXP	BI EXP	DEV/CON/ENG	KM FAM	MY KN ASSET	MY KN APPREC	MY KN SUFF	STUDY MORE	KM DBASE	BI CARES	BI RECOGN	SHARE IDEA	FAIR TREAT	IDEA ACCEPT	IDEA MOTIV	INNO ENV
57	2	2	2	3	3	1	1	1	0	1	2	0	1	-1	1	1	1	0	1
58	3	2	3	14	1	3	1	1	1	1	1	1	1	0	1	1	0	1	0
59	2	2	2	6	6	2	1	1	0	1	0	1	0	0	1	0	0	0	0
60	2	2	2	2	2	1	0	0	1	0	0	1	0	0	1	0	1	0	0
61	3	2	3	8	1	1	0	0	0	2	1	0	0	1	0	0	0	0	0
62	3	2	2	15	1	2	1	0	0	-1	1	1	0	-1	2	1	1	1	1
63	2	2	2	5	1	1	0	1	1	1	2	1	1	0	1	0	0	1	2
64	3	1	2	10	1	1	1	1	2	1	1	0	1	0	1	1	1	1	1
65	3	1	3	12	3	1	0	1	2	2	2	0	1	-2	2	0	2	1	0
66	3	1	2	20	10	1	1	1	1	1	1	0	1	1	1	1	1	1	1
67	3	2	2	19	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
68	2	2	3	1	1	3	1	0	2	0	0	0	1	0	0	0	1	0	0
69	2	2	3	1	1	1	0	1	1	1	2	0	1	0	1	1	1	0	1
70	3	2	1	10	1	1	0	0	0	0	2	1	1	1	0	0	0	0	0
71	3	2	2	16	13	1	0	1	0	1	1	0	0	1	1	0	0	1	1
72	2	2	3	2	1	1	1	0	1	1	1	0	1	0	1	1	1	1	1
73	2	2	3	3	3	2	1	2	2	0	2	0	0	0	2	0	2	2	0
74	2	2	2	10	3	1	1	1	1	0	1	1	1	1	1	1	1	1	1
75	3	1	1	15	3	2	0	0	1	2	2	0	2	2	2	2	2	2	2
76	2	2	2	4	1	1	0	1	1	-1	2	0	1	1	1	1	1	1	1
77	3	2	3	6	1	2	1	1	1	1	1	0	0	0	2	0	0	1	1
78	3	1	2	13	2	1	1	1	0	2	1	0	0	0	0	0	0	0	0
79	3	2	3	15	1	1	0	2	1	1	1	0	-1	-1	1	1	-1	1	1
80	2	2	3	1	1	1	1	2	1	0	2	0	0	0	2	1	1	1	1
81	2	2	2	4	4	1	0	2	1	1	2	1	-2	-2	1	0	1	-2	-2
82	3	1	3	11	1	2	0	2	-2	0	2	0	-2	-2	2	-2	-2	0	-2
83	4	2	2	28	1	1	0	1	0	0	1	0	1	1	1	0	0	1	1
84	2	1	2	2	1	1	1	1	1	1	0	1	2	0	1	1	1	1	1
85	3	1	4	14	4	1	1	2	1	1	0	1	1	-2	1	-2	1	1	1
86	2	1	2	14	3	1	0	1	1	-1	1	0	2	0	1	1	2	2	1
87	3	2	4	17	3	1	1	1	1	1	-1	0	1	1	1	1	1	1	2
88	2	1	2	5	2	1	1	1	-1	2	2	0	1	-1	-1	-1	1	0	0
89	3	1	3	6	2	3	0	1	2	2	0	0	1	-2	0	-2	-2	-2	-2
90	2	1	2	2	2	1	0	1	0	0	2	1	0	-1	2	0	2	1	1
91	3	1	2	12	12	2	0	0	0	0	0	0	0	0	2	0	1	1	0
92	3	1	2	20	4	1	0	0	1	1	1	0	0	-1	0	0	1	1	0
93	2	2	3	2	2	1	1	1	0	1	1	1	0	-1	0	0	1	1	0
94	3	2	3	14	1	1	1	2	0	0	1	1	2	1	0	1	1	1	1
95	3	2	3	14	3	1	1	1	1	1	1	1	1	-1	1	1	1	1	1
96	2	1	2	8	1	1	0	1	1	0	1	1	1	0	1	1	1	1	1
97	2	1	2	2	2	1	0	0	1	0	2	1	1	0	1	1	1	0	0
98	2	1	2	2	2	1	1	1	1	1	0	1	2	2	2	1	1	1	1
99	2	1	1	5	3	1	1	2	0	2	2	1	0	2	2	0	2	2	2
100	3	2	2	10	1	1	0	-2	0	-2	1	0	0	-2	1	0	0	0	1
101	3	2	3	14	1	3	1	1	1	2	0	0	1	-1	2	0	0	-2	-2
102	2	1	3	8	7	1	1	1	2	1	2	1	0	0	1	1	1	0	0
103	2	2	2	5	1	1	0	0	1	2	2	1	2	1	1	1	2	2	0
104	2	1	2	12	3	1	0	1	1	2	2	1	1	2	1	-1	0	0	1
105	2	1	2	4	3	3	0	0	0	2	2	1	0	0	0	0	0	0	0
106	2	1	2	11	4	1	0	1	1	1	1	1	2	1	1	1	2	1	1
107	3	2	3	15	3	2	1	2	1	0	1	0	1	-1	1	0	0	1	-1
108	3	1	3	9	1	1	1	1	2	2	2	1	1	0	2	1	2	2	2
109	3	1	2	12	0	2	1	-1	1	1	-1	1	1	1	2	1	1	1	1
110	2	1	2	8	5	1	1	1	1	1	2	1	0	0	1	0	0	0	0
111	2	2	2	4	1	1	1	1	-2	1	2	1	-1	0	2	-1	-1	0	0
112	2	2	3	4	1	2	0	0	0	0	1	0	1	-1	1	1	1	0	0

	AGE	GENDER	EDU	EXP	BI EXP	DEV/CON/ENG	KM FAM	MY KN ASSET	MY KN APPREC	MY KN SUFF	STUDY MORE	KM DBASE	BI CARES	BI RECOGN	SHARE IDEA	FAIR TREAT	IDEA ACCEPT	IDEA MOTIV	INNO ENV
113	2	1	2	7	2	1	0	1	0	1	1	0	0	0	1	1	1	1	1
114	2	1	2	3	1	2	1	-1	1	-1	1	1	1	1	1	1	0	0	0
115	2	1	2	7	3	1	0	1	1	1	2	1	1	1	2	1	1	1	2
116	2	1	2	2	1	1	0	0	1	2	2	0	0	0	1	0	0	0	0
117	3	1	2	15	1	1	0	2	1	-1	1	1	1	1	1	-1	1	1	1
118	2	1	2	6	1	1	0	1	1	1	2	1	1	1	1	1	1	1	1
119	2	2	2	7	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1
120	3	2	1	1	3	1	0	1	1	1	1	1	1	1	1	1	1	0	0
121	3	1	2	8	3	1	0	1	1	1	1	1	1	1	1	1	1	1	1
122	3	1	3	7	5	1	0	1	1	0	1	0	1	-1	0	1	1	0	0
123	3	2	3	14	4	2	1	1	1	1	1	1	0	0	1	0	0	1	1
124	2	1	2	9	3	1	0	2	2	1	0	1	1	1	2	1	1	1	0
125	3	2	3	12	3	1	1	2	0	0	0	1	1	0	1	0	0	0	0
126	2	1	2	3	1	1	1	1	0	2	1	1	0	-1	1	0	0	0	0
127	2	2	2	1	1	1	1	0	0	1	1	1	1	0	1	1	1	1	1
128	2	1	2	1	1	2	0	2	1	1	1	1	0	0	1	1	0	0	0
129	2	2	2	2	2	1	0	0	1	0	1	0	2	0	1	1	2	0	0
130	2	2	2	2	3	3	1	0	1	1	1	0	1	0	1	0	1	1	0
131	2	1	2	5	1	1	1	2	2	2	2	1	2	1	2	2	2	0	2
132	3	2	3	12	5	1	0	1	1	1	1	1	1	-1	1	1	1	1	1
133	4	2	3	17	3	1	1	1	1	1	1	0	1	1	1	1	1	1	1
134	2	1	2	6	6	1	1	2	1	2	1	1	2	0	1	0	0	2	1
135	2	2	2	6	3	1	1	2	1	1	1	0	1	0	1	1	1	1	1
136	2	1	3	7	7	3	1	0	1	1	1	0	0	-1	1	1	1	1	0
137	4	1	2	17	1	2	0	2	1	2	2	1	1	0	2	1	1	1	1
138	4	2	3	25	1	2	1	1	1	1	0	1	1	-1	0	-1	0	1	0
139	2	1	2	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1
140	2	2	2	4	2	1	0	0	0	0	1	1	1	0	1	2	1	2	2
141	2	2	2	3	3	1	0	1	0	1	1	0	0	-1	1	0	0	0	0
142	3	1	2	11	3	1	0	1	1	1	2	1	1	-1	1	0	0	1	1
143	2	1	2	9	3	3	1	1	1	1	0	1	1	0	1	1	1	1	1
144	2	2	3	4	1	2	1	1	1	1	1	1	0	-1	1	1	1	1	-1
145	4	2	2	18	2	1	0	1	0	0	1	0	0	0	1	0	1	1	1
146	2	2	2	3	1	1	1	1	1	1	2	0	1	1	1	1	1	1	1
147	3	2	2	13	13	2	0	1	1	2	1	0	0	-1	1	1	1	-1	-1
148	2	2	2	1	1	1	1	1	0	0	1	0	1	-1	0	0	1	1	2
149	3	1	3	12	2	1	0	0	0	0	0	0	0	-2	0	0	0	-1	-1
150	1	2	1	3	2	1	0	0	0	0	2	0	0	1	2	2	1	2	1
151	4	2	3	18	2	1	1	1	2	-1	2	1	1	1	1	1	1	1	1
152	4	2	2	20	3	1	0	1	0	0	1	1	0	-1	0	0	0	0	0
153	5	2	1	33	13	1	0	1	1	1	1	1	1	1	1	1	1	1	1
154	4	1	2	16	3	1	1	1	1	2	1	1	1	0	1	1	1	1	1
155	2	1	3	3	3	1	0	1	0	1	1	0	1	0	1	1	1	1	1
156	3	2	3	16	2	1	0	-1	-1	1	-1	0	-1	-1	0	-1	-1	-1	-1
157	3	1	2	9	2	1	0	0	1	2	1	1	2	1	1	1	2	1	1
158	2	1	2	1	1	1	1	0	0	1	2	1	2	-1	2	1	1	2	2
159	2	1	2	6	6	2	1	2	2	0	2	1	2	2	2	2	2	1	1
160	4	2	3	12	3	2	0	-2	1	0	0	0	1	1	2	1	1	2	0
161	3	2	2	9	1	1	1	2	1	1	1	1	0	0	0	0	0	0	0
162	2	2	2	1	1	1	0	1	0	2	2	1	2	0	0	2	2	0	0
163	2	1	2	5	1	1	1	2	1	1	2	1	0	0	1	0	0	0	2
164	2	1	3	5	2	1	0	1	0	1	1	0	0	1	2	1	1	1	1
165	3	1	2	15	3	1	1	1	1	2	2	0	0	0	2	0	0	0	-1
166	5	1	1	43	5	2	1	2	2	2	2	0	-2	-1	2	0	0	0	-1
167	3	1	3	16	1	1	0	2	0	0	-1	0	0	-1	2	-1	0	-1	-1
168	2	2	2	9	1	2	0	0	1	1	1	1	1	1	1	1	1	1	1

	AGE	GENDER	EDU	EXP	BI EXP	DEV/CON/ENG	KM FAM	MY KN ASSET	MY KN APPREC	MY KN SUFF	STUDY MORE	KM DBASE	BI CARES	BI RECOGN	SHARE IDEA	FAIR TREAT	IDEA ACCEPT	IDEA MOTIV	INNO ENV
169	5	1	3	35	1	2	1	2	0	1	2	1	1	-1	2	0	0	0	0
170	3	1	3	8	1	1	0	2	1	1	1	0	1	-1	2	0	1	1	-1
171	5	1	3	26	1	2	1	1	1	1	2	0	1	1	2	1	2	1	1
172	3	1	2	8	2	2	0	1	1	-2	1	0	2	1	1	1	1	1	1
173	2	2	2	1	1	3	0	1	1	0	2	0	1	0	1	-1	0	-1	-1
174	2	1	2	3	3	1	0	1	1	2	2	1	2	1	1	1	1	-1	1
175	2	1	3	5	2	3	0	0	-2	-2	-2	0	-2	-1	-2	-2	-2	-2	-2
176	3	1	3	20	1	3	0	0	2	1	1	0	1	-1	1	1	1	0	0
177	3	1	3	11	3	1	0	1	1	1	1	1	1	-1	0	-1	0	1	-1
178	2	2	2	1	1	2	1	1	1	1	1	0	1	-1	1	1	1	1	1
179	2	2	2	4	3	1	1	1	1	2	1	1	2	0	1	0	1	1	1
180	2	1	3	2	2	1	0	2	0	0	1	1	1	1	2	1	1	1	1
181	2	2	2	8	3	1	1	1	-1	0	1	0	0	-2	0	0	0	-1	0
182	5	1	2	34	2	1	0	2	0	1	-1	0	0	0	1	0	0	0	0
183	5	1	3	27	8	2	1	1	0	0	0	1	0	-1	1	-1	0	0	-1
184	2	2	3	7	2	1	1	1	1	2	1	1	1	1	1	1	1	1	1
185	2	1	2	3	2	3	0	1	1	1	2	0	1	-1	2	1	0	0	0
186	3	2	2	10	3	2	0	2	1	1	2	0	1	-1	1	1	1	1	0
187	3	1	2	8	2	1	1	2	1	1	1	1	1	0	1	0	1	1	1
188	2	1	2	4	2	1	0	1	0	2	1	1	0	0	1	1	2	2	2
189	2	1	2	7	1	1	1	1	1	-1	0	1	1	-1	-1	0	0	0	0
190	4	1	2	27	11	1	1	2	2	2	2	1	2	2	2	1	1	0	2
191	2	1	2	8	7	2	0	1	1	1	0	0	2	1	1	1	1	1	1
192	2	2	2	3	1	1	0	1	0	1	1	0	1	-1	1	0	1	1	1
193	3	1	3	14	2	1	1	1	1	2	2	1	2	0	1	1	1	1	1
194	2	1	2	3	2	3	0	1	2	1	2	1	2	2	1	1	-2	0	0
195	3	1	3	15	2	1	0	2	1	1	1	0	1	1	1	1	1	1	1

COLUMN SCORING:

AGE	<20 1	20-29 2	30-39 3	40-49 4	>50 5
GENDER	M 1	F 2			
EDU	HS 1	BS 2	MS/Spec 3	PhD 4	
EXP BI EXP	Years Years				
DEV/CON/ENG	DEV 1	CON 2	ENG 3		
KM DBASE KM FAM	YES 1	NO 0			
MY KN ASSET MY KN APPR MY KN SUFF STUDY MORE BI CARE BI RECOGN SHARE IDEA FAIR TREAT IDEA ACCEPT IDEA MOTIV INNO ENVIR	STR AGR 2	AGR 1	RATHER 0	DISAGR -1	STR DIS -2