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HUMAN RESOURCES CHALLENGES IN THE NUCLEAR INDUSTRY (KNOWLEDGE RETENTION AND TRANSFER (KRT)) IN THE UNITED KINGDOM (UK) AS REFERENCE

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Abstract

Purpose: The objective of this paper is to examine the relationship between theories on Knowledge Retention and Transfer (KRT) and practices currently established in the UK nuclear industry and analyze the effectiveness of these practices in the context of the theories. It further examines the current labour market issues around the UK nuclear industry and look closely at the supply and demand side of it, focusing on expert workers such as engineers, technicians and scientists and further examine the key concept about theories and ideas of knowledge management and KRT in particular.

Methodology: This research is based mainly on the information gathered from secondary sources. The methodology adopted in this research is the doctrinal method. Materials to be relied on includes secondary sources; books, energy and management related academic journals, websites from Professional bodies, publications merely related to industry, official documents and statistical information and other publications by scholars in the Nuclear energy field are relied on.

Findings: This research found that the UK nuclear industry will require significant number of new highly skilled and qualified workers in the near future. Due to the age profile of the nuclear workforce, industry should focus on the retention of existing employees in order to transfer tacit knowledge. While focusing on knowledge transfer more attention will be paid to transfer of tacit knowledge. The main reason for doing this is the fact that most organizational knowledge is tacit or rooted in it and its transfer represents the biggest challenge for organisation.

Unique contribution to theory, practice and policy: This study contributes to knowledge that, by giving Scholarships and funding alternatives for the students and teachers interested in the nuclear industry and grants for practical training in the nuclear industry for the purpose of knowledge retention and transfer in the UK Nuclear Industry. It is further recommended that additional HRM activities in support of the complex staff development system is needed for actual knowledge Retention and Transfer

Keywords: *Human Resource, Challenges, Nuclear Industry, Knowledge retention*

1.0 INTRODUCTION

There are currently sixteen operating nuclear reactors in the UK with a total capacity of 10,043 megawatt (MW) (Department of Energy and Climate Change, 2018a), The share of electricity generated by the nuclear fission in 2018 was 18% (Department of Energy and Climate Change, 2018b), The nuclear electricity represented almost two thirds of the total low-carbon energy generated in the United Kingdom in the year 2011.

According to the Digest of United Energy Statistics 2020 (BEIS), the Nuclear Power sector provides about 19.5 percent of the United Kingdom's electricity and produced a small percentage of carbon dioxide. However, most of the UK 's nuclear reactors are near to the end of their operational lives and scheduled to shut down by 2023 (Department of Energy and Climate Change, 2018a), Only one plant in SizewTell B will continue to operate (The Nuclear Energy Skills Alliance, 2013), Moreover, almost third of the country's coal fired power stations are due to retire by the same 2023 potentially creating an energy gap if no new nuclear power stations or other energy generating plants are built (BERR, 2012). It was estimated that 20-25 giga watt (GW) of new generating capacity has to be built by 2020 so that growing energy demand could be met (BERR, 2017).

It can be noted that affordability, security, safety and security were key factors in making the actual decision regarding the United Kingdom's Nuclear Energy future. Energy security and climate change were named as the main drivers for new nuclear build in the UK (Goodfellowy Williams and 2013; Greenhalgh and 2012; Baker, Stoker and Simpson, 2013), Natural gas is the main source of electricity in Britain, about 41% of all electricity in the UK in 2017 was generated from natural gas (Department of Energy and Climate Change, 2018c). However, Britain's natural gas resources are rapidly diminishing while the share of imported gas is increasing (Baker, Stoker and Simpson, 2016). Level of import dependency has risen from 26,6% in 2012 to 36.5% in 2017 (Department of Energy and 2017; Baker Stoker and Simpson. 2017}. About 41% of all electricity in the UK in 2011 was generated from natural gas (Department of Energy and Climate Change. 2018c)

However, Britain natural gas resources are rapidly diminishing while the share of imported gas is increasing (Baker. Stoker and Simpson, 2017). Level of import dependency has risen from 26.6% in 2009 to 36.5% in 2011 (Department of Energy and Climate Change, 2018). For example, gas and oil prices have risen dramatically since 2003 from S28/ barrel to $127/barrel in May 2011 (Baker 2018).

Moreover, any instability in supply can further increase the price or/and leave people without electricity (Watson, 2016). Another example would be the consequences of instability in gas supply. Climate change drives for the necessity of Nuclear Energy. Its effects can be seen easily these days. That is why a number one priority for many countries is to stop further damage to die environment. As the UK Government introduced the Climate Change Act in 2008 which legally obliges the country to reduce the carbon emission by 35% by 2020 and by 80% before 2050 as its National Determination Contribution (NDC) toward the reduction of mission as targeted in the Parish agreement (Department of Energy and Climate Change, 2018)

Thus, current instability in prices and supply on the energy market, the lifetime of existing plants, rapidly growing world's energy demand, from natural resources, and increasing pressures of

climate change played in of die new nuclear build (Goodfellow, Williams 2017; Greenhalgh and 2009; Hart 2017) and in January 2008, the UK Government published the White Paper on nuclear power where it stated that nuclear power was going to play a key role in the UK 's future energy mix providing the country with secure, safe and affordable electricity [BERE, 2012).

1.1 Statement of Problem

Giving a lean attention to the issues of Nuclear energy will create an undue risk to safe, reliable and efficient application of Nuclear plants and will also pose a threat to sustain a competitive advantage. The operation of nuclear energy needs the availability of Knowledge, and skill to manage the safe operations of Nuclear electricity, at the same time, there is need to recruit these professionals while the existing ones get retired due to legal age. Hence, there is need to heavily rely on skilled people who have the actual, still, knowledge and experience in the operations.

Knight, in 2008 states that the United Kingdom is having a shortage of qualified workforce in the Nuclear section in terms of skill, knowledge in the operations. The knowledge gap will only grow with time if no actions are taken, given the ageing workforce and very little fresh blood entering the industry. This is due to the fact that most skilled workers who were working in the industry since the first plaint was commission retired. These first workers have a wide knowledge that was acquired over time through working experience. It can be added that the vast knowledge acquired over time is the hardest to manage and it can be very difficult to transfer it into any formal storage facility.

It is even more challenging these days since the number of qualified replacements is very low. Hence, the high risk of losing the technical know-how in the operations of Nuclear knowledge if urgent attention is not given.

1.2 Aim and Objectives

The aim of this dissertation is to look at Human Resources Challenges in The Nuclear Industry (Knowledge Retention and Transfer in (KRT)) the United Kingdom (UK) as Reference

The objectives of this paper are:

i. To examine the relationship between theories on Knowledge Retention and Transfer (KRT) and practices currently established in the UK nuclear industry and analyse the effectiveness of these practices in the context of the theories.
ii. To examine the current labour market issues around the UK nuclear industry and look closely at the supply and demand side of it, focusing on expert workers such as engineers, technicians and scientists;
iii. To examine the key concept about theories and ideas of knowledge management and Knowledge Retention and Transfer (KRT) in particular.

2.0 LITERATURE REVIEW

Certainly, it would be an incomplete work, or perhaps meaningless, if this paper fails to examine the subject matter of discourse -human resources challenges in the nuclear industry Knowledge Retention and Transfer (KRT)) in the United Kingdom (UK) as reference. In order to examine, summarize, evaluate and clarify the related works of other scholars as related to this work and also to establish a fundamental basis for this research, the literature was reviewed under the following

sub-themes: Theoretical Framework and empirical research on the Nuclear industry (knowledge and retention).

2.1 Theoretical Framework

The situation around the UK nuclear human resources has been a hot topic of discussion over the past 20 years. Since the future of this industry strongly relies on its knowledge, concern has been raised about shortages of people with the right skills and experience as well as about the ageing profile of the current workforce and a high level of scheduled retirements in the next 15 years. Therefore, there is a high risk that vast amount of critical knowledge accumulated by the first generation of experts since the "Golden Years" of Nuclear Engineering could be lost or not fully transferred (Von Estorff and Debarberis, 2017). Hence, one of the most critical challenges for the UK nuclear industry in the near future will be development of effective KRT strategies.

Giving a lean attention to the issues of Nuclear energy will create an undue risk to safe, reliable and efficient application of Nuclear plants and will also pose a threat to sustain a competitive advantage.

Knowledge

In order to fully understand why departure of some employees can cause significant knowledge loss in a company, it is important to understand the nature of knowledge and its qualities. The meaning of Knowledge is debatable even from time immemorial of the Greece Classical period. According to Nonaka 1994, the term "knowledge" has several definitions over time. This research will focus on the most 36 frequently used definitions that can be found in KM related articles and journals. The very first explanation of knowledge stems from the Classical Greece period, where it was described as "justified true belief' (Zwass, 2018).

As we can see below, the definition of Knowledge seems to gained more complexity. For instance, Kreiner (2012, p.62) attempt to define knowledge as: "*a transient type of resource, as its relevance and credibility are time and context dependent."* He further states that, "*We cannot regard knowledge as something that we once for all have collected and constructed. Knowledge must constantly be reproduced through execution*".

Here it is important to note, that as a resource, knowledge has special qualities that are very different from any other type of resource held by a firm (Adler, 1989; Dalkir, 2015; Sadler, 1988). From the above, it can be inferred as follows; first, knowledge can be constantly reproduced through execution. Second, the transfer of knowledge to others will help in retaining the knowledge. To put it in another words, knowledge never die from the sender even if it is transferred to others. Thirdly, nowadays people have access to unlimited sources of knowledge.

However, the ability to use it is scarce. Lastly, organizational knowledge in situations where it is not managed has a tendency of being lost as a result of employee exiting the company. Another very popular definition of knowledge is given by Davenport and Prusak (2009, p.5), he defines Knowledge as "*fluid mix of framed experience, values, contextual information and expert insight that provide a framework for evaluation and incorporating new experiences and information* ".

Indisputably, the distinction between Data Information and Knowledge is necessary (Nonaka, 1994 and Spender, 1996). Data usually represents raw numbers and words. Information is data that has been structured or organized in a meaningful way. Finally, knowledge is a reflection of

information through the prism of individuals' beliefs, values, experience, motivation and action (Nonaka, 1994). At last, some definitions emphasize close connection of knowledge to action and ability to deliver expected results (Alavi and Leidner, 1999; Brown and Duguid, 2001; Drucker, 2003 Nahapiet and Ghoshal, 1998; Senge, 1999; TsoUK as, 1996 and Zwass, 2008). In other words, they state that doing is inseparable from knowing.

So, for instance, two great scholars define knowledge to mean "*capacity for effective action or decision making"*. Senge (1999) and DeLong (2004). It can be inferred from the definition that knowledge is a requirement needed to get a desired result in any field. Summing up, although there are slight differences in the above-mentioned definitions, there is a general view of knowledge as dynamic, time specific, strongly related to the organizational context and its value is defined by action.

Knowledge Retention and Transfer in the UK Nuclear Industry

The UK nuclear industry will require significant number of new highly skilled and qualified workers in the near future. It will have not only to attract new professionals to meet future demand and replace retirees but also develop new skills to meet the requirements of a new build programme. In addition, due to the age profile of the nuclear workforce, industry should focus on the retention of existing employees in order to transfer tacit knowledge successfully to the next generation. This is important condition for successful KRT process because knowledge is created and shared through social networks and requires extensive social interaction between predecessor and successor. Due to industry specific factors, context and complex expertise, KRT strategies can differ from the one discussed in the literature. Nuclear industry even has its own definition of knowledge and KM that better reflects the industry nature, needs and requirements.

Why Knowledge Management is Important for the UK Nuclear Industry

The loss of important nuclear knowledge due to the retirement of the first generation of workers will pose a significant threat to safe and economically effective operation of nuclear plants, and it also create the effect of public view and trust (Faust, 2007). Therefore, KRT in the most critical areas such as design, construction, operation, maintenance and decommissioning of the plant is a vital part of the UK nuclear KM strategy (IAEA, 2011). It is interesting to note that the nuclear industry understanding of KM importance differs significantly from the one defined in the theory.

The industry, on the other hand, while taking the above factors into consideration, places safety issues above everything. Researcher believes that due to the current situation around nuclear workforce, growth of the decommissioning sector and ambitious new nuclear build projects worldwide, the main goal of nuclear KM is defined differently from the one found in the academic literature (Nickols, in Dalkir, 2005).

The focus is not on the knowledge-related processes and their effectiveness, but on the people, who works in the industry and people who hold relevant knowledge. IAEA defines effective management of nuclear knowledge as "ensuring the continued availability of qualified personnel" (IAEA, 2011, p. 49) because only then it will be safe, efficient and secure to operate NPP, innovation will prosper and the benefits of nuclear energy will be available for future generations.

Moreover, the Convention of Nuclear Safety (article 11.2, in IAEA, 2006, p. 22) states that each Member State is responsible for providing the sufficient number of highly skilled workers with relevant experience and skills for all safety-related processes for every NPP throughout its life.

To sum up, the main difference between reviewed literature and reality is that the idea of safe and secure operation of nuclear plants runs through the entire industry which is also reflected as one of the imperatives in its KM strategy whereas in theory such matters as competitive advantage and efficiency have a higher priority.

UK Experience and Perspective on Knowledge Retention and Transfer

For the same reasons as for the whole nuclear industry, the UK's KRT strategy is focused on the attraction of young employees to the industry. For that purpose, in 2004 the Nuclear Technology Education Consortium (NTEC) was formed. It came up with about eleven educational organisations with about 20 different areas of specialisation for the Masters' programms (Nuclear Industry Association, 2012).

They provided students with real projects that let them gain some insights into the nuclear industry. The success of new Master courses and interest expressed by the younger generation to the nuclear subjects led to the development of new undergraduate courses in 2006. Furthermore, additional PhD programms were made to train more than twenty student per year (Nuclear Industry Association, 2012). To make the inflow of young employees to the industry even higher in the future, visits of nuclear experts to schools are taking place regularly. They are advising about challenges, opportunities and secure career paths within the sector. In addition, in 2008 in order to maintain the sufficient supply of skilled workers, meet future demands of the rapidly growing industry and address current workforce challenges the National Skills Academy for Nuclear was launched (The National Skills Academy Nuclear, 2008).

Having examined the UK human resources challenges in the nuclear industry and discover that knowledge retention and transfer are the core HR challenges in the UK 's nuclear energy sector. The research shows that cooperative and collaborative organizational culture, advance technology and identification of business-critical knowledge for successful knowledge retention and transfer (KRT) process.

2.2 Overview of the Reasons for Nuclear Skills Shortage in the UK

History has it that the Commercial Nuclear Power Station which is the first in the world was built in 1956 in the Britain (Baker, Stoker and Simpson, 2011). The UK industry considerably developed over the next few decades with the construction of 33 new nuclear reactors between 1956 and 1976, which was followed by a significant drop in Nuclear building during the early and late of 1980 (Department of Energy and Climate Change, 2012a).

Good fellow, Williams and Azapagic (2011) believe that two major accidents, namely Three Mile Island in 1979 and Chernobyl in 1986, had a great influence on the level of new nuclear installations. Public perception of the safety of nuclear energy was affected, which raised the profile of anti-nuclear movements (for example, Greenpeace) and forced many Governments to roll back with their new nuclear programmes and even to phase out existing ones in some countries (Kettunen, Reiman and Ahlstrom, 2007). Almost 20 years since the last major nuclear disaster, the UK Government still had doubts about the long-term future of nuclear power.

As a result, in 1997, the UK's newly elected Labour party decided to focus on renewable energy by stating: "We *see no economic case for the building of any new nuclear power stations"* (Labour Party, 1997).

Around, 2003, the British Government published a white paper reviewing the extant enercly laws with the mind of building new plaints to meet up with carbon reduction target (DTI, 2003) Five years later, in 2008, the New Labour Government announced that nuclear power is going to play a key role in the UK 's future energy mix (BERR, 2008a).

Therefore, in eleven years the Government of the United Kingdome has drastically shifted it stand on nuclear policy ranging from in 1997 to neutrality in 2003 and to advocacy and support in 2008 (Greenhalgh and Azapagic, 2009). To conclude on this point, the UK and European uncertainty about the future of nuclear programmes have made the British industry less attractive for the younger generation as it could not offer a secure career with a well-defined path (Kettunen, Reiman and Wahlstrom, 2007). As a result, fewer young people were choosing education and employment in this sector in the UK.

In addition, decline in the construction itself, with the last plant built in 1995, and low workforce turnover, which is typical for NPP, has led to a steady decrease in the nuclear supply base over the last 20 years (Warwick, Penney and Krishna, 2012; Kettunen, Reiman and Wahlstrom, 2007; IAEA, 2004). Due to the lack of need for new recruits in the industry, very little attention has been paid to the development of an effective attraction and recruitment policy for the last 25 years. in other words, there was nothing done to promote nuclear engineering or nuclear technician professions to the younger generation.

To summarize, uncertainty about the nuclear future, a break in the construction of new nuclear plants, reductions in government funding for nuclear research and development, negative public perceptions of the industry, slow career growth and low salaries has made the industry less attractive for the younger generation. As a consequence, the number of students choosing nuclear, as well as science, engineering and technology disciplines, has dropped significantly.

2.3 Empirical Review

Energy companies have announced their plans to build up to 16 GW of new nuclear power capacity in the UK by 2025 (The Nuclear Energy Skills Alliance, 2013). New build will create approximately 10,000 jobs per year until 2025 (The Nuclear Energy Skills Alliance. 2015). However, it could be very challenging to attract, recruit and retain qualified, experienced and competent staff, given the size and demographic of the industry as well as a huge difference in supply and demand side of nuclear experts (Simappyska and von 2018). The number of graduates and young people entering the sector is extremely low and the number of scheduled retirements for the next 10-15 years is high. About 50-70% of the UK's experienced workforce will due to retire by 2025 (The Nuclear Energy Skills Alliance. 2013). For example, about 30% of staff of British Energy is over 50 and 70% is over 40 (Knight, 2012).

Thus, in order to meet a growing demand for nuclear experts in the nearest future energy companies will not only have to attract and retain new people, but also successfully replace experienced retired staff and transfer their knowledge to a new generation which can take anything from one to eight years depending on the function (IAEA, 2004). Moreover, on one hand the average time graduates need to become fully professional (gain relevant skills and experience) is

ten years. To make matter even more difficult, technical and professional staff for a new nuclear plant have to be recruited 5 years in advance before the plant starts its commercial operation (IAEA, 2004). Planned commercial operation for the UK's first new nuclear reactor was scheduled for 2018 leaving very little time to fulfill the future demand for nuclear experts. This situation potentially can create a skills shortage that can pose a threat to safe construction, commissioning and operation of the Nuclear Power Plants (NPP) and put the whole programme at a serious risk. In addition, UK new nuclear build faces a skills competition on national as well as international level from other big nuclear and non-nuclear construction projects which require technical and engineering staff.

HR Challenges the UK Nuclear Industry is Currently Facing

A multitude of different factors that have been influencing the UK nuclear industry for decades have made the current situation with existing skills and expertise almost critical. It became more obvious after the government approved the new nuclear build programme. Thousands of professionals will be needed for the next 13 years to make the construction, maintenance and operation of the current and the new nuclear fleet possible. Unfortunately, rapid ageing of the workforce combined with a soaring number of scheduled retirements, low attractiveness of the industry to the younger generation, small numbers of students entering nuclear related disciplines and fierce competition from other high technology industries to recruit young talent jeopardizes the new nuclear build programme. Therefore, the main challenges for HR specialists in the UK nuclear industry today are:

1. To attract, recruit and retain suitably qualified graduates as well as skilled and experienced workers in a highly competitive environment;
2. To secure additional investment for training and development programmes for existing and new employees. So, the former can acquire new skills and have a smooth transition from the energy production and fuel processing divisions to the decommissioning division and the latter can develop the required skills for safe operation of new advanced technology;
3. To manage a larger workforce, which will require to make structural and functional changes to the organisation.

3.1 RESEARCH METHODOLOGY

The methodology adopted in this research is the doctrinal method. Materials to be relied on includes secondary sources; books, energy and management related academic journals, professional body's websites, industry-based publications, official documents and statistical information and other publications by scholars in the Nuclear energy field are relied on. The study is approached from analytical perspectives with review of current literature was carried out to create a theoretical foundation for KM, to gain a better understanding of current climate of nuclear labour market, and to analyze the effectiveness of existing practices in KRT in the industry.

4.0 FINDINGS AND DISCUSSION OF RESULTS

4.1 Findings

This paper finds that the UK nuclear industry will require significant number of new highly skilled and qualified workers in the near future. It will have not only to attract new professionals to meet

future demand and replace retirees but also develop new skills to meet the requirements of a new build programme. This paper further finds that, due to the age profile of the nuclear workforce, industry should focus on the retention of existing employees in order to transfer tacit knowledge successfully to the next generation.

While focusing on knowledge transfer more attention will be paid to transfer of tacit knowledge. The main reason for doing this is the fact that most organizational knowledge is tacit or rooted in it and its transfer represents the biggest challenge for organisation. The study finds that the Civil Nuclear Industry Jobs Map indicates a spread of highly skilled employment across the UK in power station construction and operations, manufacturing, decommissioning, research and development, waste management and nuclear fuel but as experienced staff retire, so critical knowledge leave with them, which leaves UK Nuclear Industry highly exposed because the knowledge was not retained and transferred junior, and less experienced staff.

Fewer students are pursuing traditional engineering degrees, let alone the nuclear engineering. Therefore, a significant gap between the number of B.S. graduates available and will demands exists and become even worse in the near future.

Managing the recruitment planning in a complex manner is a highlighted task as the number of retiring employees bearing superior professional expertise and experiences is reported to significantly increase in the following years, placing extreme emphasis on the importance of the transfer of available corporate knowledge and experiences. To ensure supply in positions that require a longer duration of preparation or specific professional skills the UK Nuclear industry tens to create the so called ‘apprentice posts. These posts can only be filled in if a job incumbent reports intention of retirement.

The paper finds that in order to enhancing HR management in the UK Nuclear Industry, two critical questions be addressed in the development of human resource strategy: What kinds of people do we need to manage and run our business to meet our strategic business objectives?

4.2. Discussion

The main characteristics of the nuclear labour market that can negatively impact the future of the industry are rapid ageing of the workforce, a soaring number of scheduled retirements, low attractiveness of the industry to the younger generation, small numbers of students entering nuclear related disciplines and aggressive competition from other high technology industries to recruit young talented employees. Analysis of the current labour market trends helped to identify the main challenges that HR specialists in the UK nuclear industry are facing. They are as follows:

i. to attract, recruit and retain suitably qualified graduates as well as skilled and experienced workers in a highly competitive environment;
ii. to secure additional investment for training and development programmes for existing and new employees. This would let employees to acquire new skills required for safe operation of new advanced technology and for a smooth transition from the energy production and fuel processing divisions to the decommissioning division;
iii. to manage a larger workforce, which will require to make structural and functional changes to the organisation;
iv. to preserve and transfer existing nuclear knowledge and expertise to the new generation of employees.

It is clear from the study that by 2025 2/3 of the skilled workers in the Nuclear industry will be gone through retirement, the knowledge and experience gained during the last 69 years at the risk of being lost. Therefore, the last challenge was considered by the researcher as the biggest and the most important HR challenge due to the safety-critical nature of the nuclear operations. This challenge received all the attention when the two following objectives were discussed.

Pertaining to the second objective of this paper, this paper states that Knowledge Retention and Training is important aspect of every Knowledge management strategy. There were two main tactics of knowledge transfer identified: personalization and codification. They are used to transfer tacit and explicit knowledge respectively. In addition, identification of critical organizational knowledge, nurture of the knowledge sharing culture, development of programmes that motivate employees to share knowledge are fundamental for successful knowledge transfer. On the other perspective, process Knowledge Retention and Training can be sustained if proper information technology use are created and applied concurrently. However, the choice of KRT strategy is predetermined by knowledge type, knowledge retention goals, organizational context, the urgency of the transfer and availability of the expert and the successor.

Only after careful consideration of all the factors the most suitable KRT strategy 72 can be identified. This is very vital in the nuclear sector where Knowledge Management will take into precaution, the challenges related to expected standards of required safety and extended life cycle of the cutting-edge nuclear technology and extremely specialized areas of expertise.

In the last objective of this research paper, several arears of similarity were pointed out between Knowledge Retention and Training techniques in the UK and the one examine in the literature review. First, they both employ the same personalization and codification techniques, tools and instruments when transferring knowledge. Second, they recognize and address the importance of trust, collaborative and knowledge sharing culture. And, finally, in practice and in theory before the transfer takes place knowledge is prioritized, so only critical for organisation knowledge is captured.

Therefore, the main goal of the UK nuclear KM strategy and its effectiveness are also different from the theory and achieved through continuous supply of suitably qualified personal. Moreover, this fact also influenced the way UK nuclear KRT programmes are designed and implemented. Another, distinctive characteristic of the UK nuclear KRT process is its preference to codification techniques. Again, it is all about the safe and secure operation of nuclear plants. This technique provides opportunity to capture knowledge which can be easily accessed, applied and reused at any time.

Moreover, it is certain, precise, easier to audit and share throughout the organisation. This is important in the situation where big geographically dispersed organisation operates more than just one complex facility that involves a few generations of employees. The last and unique characteristic of nuclear KM and KRT process is its universal application. To be more specific, many industries trying to keep their achievements in KM just for themselves, so they can stay competitive and prosper, whereas nuclear industry shares its successful experience in KM on the industry level and internationally.

A key area of recruitment planning is the provision of high standard and on-going supply for posts that require higher academic education but represent no managerial functions and of those

positions where medium level academic education as well as superior professional experiences are required. This objective is supported through the professional career development programme. Within its framework the acquisition, the extension, the development and the in depth upgrading of the professional knowledge are being accomplished. This may equally serve as a basis for promotion opportunities within the professional hierarchy. To this end, we provide the entries of this programme all conditions for the acquisition of continuously renewing and expanding information, for the accomplishment of specific abilities that are practical, up-to-date and market oriented. The circle of staff members to be admitted to this programme is defined according to the recruitment needs of the individual line organizations. The line organizations — considering the expected retirements — examine the best recruitment method for key positions with respect to the functioning of the organization and initiate the inclusion of that staff member into the programme who is selected to fill in the vacant job.

5.0 CONCLUSION/ RECOMMENDATIONS

5.1. Conclusion

The aim of this dissertation was to look at the HR challenges that the UK nuclear industry is currently facing and to analyze in depth one of them - knowledge retention and transfer. The focus was on knowledge because the safe and reliable operation of nuclear plants is the primary concern of all times.

The safe and reliable operation of nuclear plants strongly relies on skilled people who have the right knowledge and experience. However, there is a shortage of qualified people in the UK nuclear industry, given the ageing workforce and very little fresh blood entering the industry (Knight, 2018). Most of the people who are due to retire have been working in the industry since the first plants have been commissioned. This knowledge is the hardest to manage and it can be challenging to transfer it into any formal storage facility.

Thus, it was decided to look at how this issue is addressed by theory and by the UK nuclear industry. The main characteristics of the nuclear labour market that can negatively impact the future of the industry are rapid ageing of the workforce, a soaring number of scheduled retirements, low attractiveness of the industry to the younger generation, small numbers of students entering nuclear related disciplines and aggressive competition from other high technology industries to recruit young talented employees. Analysis of the current labour market trends helped to identify the main challenges that HR specialists in the UK nuclear industry are facing.

The current situation in the UK nuclear industry, where two thirds of these professionals will be lost through retirement by 2025, puts the knowledge and experience accumulated for almost 60 years at the risk of being lost. Therefore, the last challenge was considered by the researcher as the biggest and the most important HR challenge due to the safety-critical nature of the nuclear operations.

5.2 Recommendation

According to the study, there is need for experienced manpower demands in the next 15 years, the quantity of employees in the nuclear field will attain on 8000 to 16 000 while 3000 today, which

causes a big challenge in terms of manpower development in the UK Nuclear Industry. Hence, a tangible human resource plan should be in place to address the problem.

To encourage knowledge retention and transfer in the UK Nuclear Industry, Scholarships and funding alternatives for the students and teachers interested in the nuclear industry and grants for practical training in the nuclear industry. Maintain visibility on university campuses, including participation in career fairs, and information sessions, as well as selection of nuclear specialists to deliver lectures in universities. UK Nuclear Industry shall participate each year in educational trade job fairs and encourage young people into programmes that will prepare them to join their workforce.

The study finds that Knowledge Retention and Transfer (KRT) Strategy is an approach to reducing the risk. The Knowledge Retention Strategy is developed through conversations with senior managers, middle managers and HR, and through the scanning and mapping the priority topics

It is further recommended that additional HRM activities in support of the complex staff development system is need for actual knowledge Retention and Transfer, hence, the following shall be taking into reconsideration.

BIBLIOGRAPHY

Argote, L. and Ingram, P., (2012) Knowledge transfer: a basis for competitive advantage in a firm. Organisational Behavior and Human Decision Processes. 82(1), pp. 150-169.

Argote, L., McEvily, B. and Reagans, R., (2012) Managing Knowledge in Organisations: An Integrative Framework and Review of Emerging Themes. Management Science. 49(4), pp.571-582.

Auger, M. and Vendelo, M., (1999) Networks, cognition and management of tacit knowledge. Journal of Knowledge Management 3(4), pp. 252-261.

Adler, James N. managing the Whistleblowing Employee. 8 The Labor Lawyer

Baker, K., Stoker, G. and Simpson, J., (2013) Assessing the prospects for a revival of nuclear power in Britain. Special issue paper. Power and Energy. (A: J) pp. 1-12. BBC, 2009. Russian gas flow disappoints EU.

BBC News. Available at: http://news.bbc.co.UK /1/hi/world/europe/7827636.stm. (Accessed: 03.08.2019).

BBC, 2018. Germany: Nuclear power plants to close by 2022.

BBC News. Available at: http://www.bbc.co.UK /news/world-europe-13592208 (Accessed: 11.08.2019).

Berr, 2012. Energy Markets Outlook Department for Business Enterprise and Regulatory Reform, available at http://www.berr.gov.UK /files/file41995.pdf.

Berr, 2012. Meeting the Energy Challenge – A White Paper on Nuclear Power. Cm 7296. Department for Business Enterprise and Regulatory Reform. Norwich, The Stationery Office.

Berr, 2012a. New nuclear is indispensable, Hutton tells top energy meeting. Press Release, Thursday September 18, 2012 00:01, Department for Business Enterprise and Regulatory Reform.

Bhatt, G., (2012) Knowledge management in organisations: examining the interaction between technologies, techniques and people. Journal of Knowledge Management. 5 (1), pp.68-75.

Biggam, J. (2012) Research Methods. Glasgow: Glasgow Caledonian University.

Brown, J. and Duguid, P., (1991) Organizational learning and communities of practice. Organization Science. 2(1), pp.40–57.

Bryman, A. and Bell, E. (2012) Business Research Methods. New York: Oxford University Press.

Chakraborty, S. (2012) How to maintain and enhance knowledge transfer in the nuclear energy industry? Centre for nuclear safety.

Chai, K.-H. and Nebus, J., (2017) Personalization or Codification? A Marketing perspective to optimize knowledge reuse efficiency. IEEE. Transactions on Knowledge Management. pp. 1-19.

Civi, E., (2012) Knowledge Management as a competitive asset: a review. Marketing Intelligence and Planning. 18 (4), pp. 166-174.

Cogent. (2012) A Skills Needs Assessment of the Nuclear Industry. Available at: http://www.nuclearliaison.com/pdfs/Cogent_A_Skills_Needs_Assessment_2005.pdf (Accessed: 22.08.2018)

Cogent (2013) Power People: The Civil Nuclear Workforce 2009-2025. Available at: http://www.cogent-ssc.com/research/Publications/NuclearReportPowerPeople.pdf. (Accessed: 15.08.2019).

Davenport, T., De Long, D. and Beers, M. (1998) Successful knowledge management Projects. Sloan Management Review. 39(2), pp.43–57.

eLong, D. (2004) Lost Knowledge: Confronting the threat of an ageing workforce. New York: Oxford University Press.

Goodfellow, M., Williams, H. and Azapagic, A., (2017) Nuclear renaissance, public perception and design criteria: An exploratory view. Energy Policy. 39 pp. 6199-6210

Dalkir, K. (2015) Knowledge Management in Theory and Practice. Oxford: Elsevier Butterworth – Heinemann.

Department of Energy and Climate Change. (2018a) Existing Nuclear power stations. Available at: http://www.decc.gov.UK /en/content/cms/meeting_energy/nuclear/current_nuclea/current_nucl ea.aspx (Accessed: 01.08.2019).

Department of Energy and Climate Change. (2018b) Statistical Press Release. Available at: http://www.decc.gov.UK /assets/decc/11/stats/publications/dUK es/5991-statistical-press-releasedUK es- 2012.pdf (Accessed: 01.08.2019).

Sadler, P. M. (1988). Those who understand: Knowledge growth in teaching. Educational Researcher, 15, 4–14

Watson, K. (2016) Engineering has ceased to be...it is a dead career. Engineering and Technology. Available at: www.theiet.org/engtechmag (Accessed: 04.08.2019).

Von Estorff and Debarberis, (2017). Accessing challenges to Nuclear Power Plant Management in Five European Countries: Methods, Results and Lessons learned. Lancaster University Management School, Lancaster, UK . Kettunen,

Vienna. IAEA (2017) Workforce planning for new nuclear power programmes. IAEA Nuclear energy series. NG-T-3.10. Vienna.

Kang, J., Rhee, M. and Kang, H. (2013) Revisiting knowledge transfer: Effects of knowledge characteristics on organizational effort for knowledge transfer. Expert Systems with Applications 37, pp. 8155–8160.