

# **Occupational stress and its effects on knowledge workers' job performance**

Samuli Koivusalo

Bachelor's thesis  
May 2020  
School of Business  
Degree Programme in International Business

Author(s) Koivusalo, Samuli	Type of publication Bachelor's thesis	Date 24.5.2020
		Language of publication: English
	Number of pages 59	Permission for web publication: x
Title of publication <b>Occupational stress and its effects on knowledge workers' job performance</b> A systematic review		
Degree programme Degree programme International business		
Supervisor(s) Saukkonen, Juha		
Assigned by JAMK Center for Competitiveness: Murat Akpinar		
<p>Abstract</p> <p>Occupational stress is a fairly well understood phenomenon alongside with its negative consequences. Research has shown that occupational stress has negative implications on the job performance of workers. The study aimed to understand and identify the effects occupational stress have on knowledge workers' job performance and what could be implemented in order to mitigate occupational stress. In this context, job performance is defined as all those activities that a knowledge worker partakes in during working hours that, on their own or indirectly increases the likelihood of meeting organizational goals.</p> <p>A systematic review was conducted with strict criteria's and the eligible studies were subject to a thematic analysis. Results from the thematic analysis showed that occupational stress has negative implications on knowledge workers' job performance in two ways. The first is decreasing productivity and efficiency and the second negative implication is decreasing organizational wellbeing which decreases job performance indirectly. The results also indicate that occupational stress can be mitigated by improving organizational culture, practicing individual responsibility and by managerial and organizational interventions.</p> <p>The results indicate that occupational stress does have negative effects on knowledge workers' job performance. In addition, the results also showcase that occupational stress can be combatted and mitigated through various ways, most notably by improving organizational culture. Other ways of mitigating occupational stress are managerial and organizational interventions, such as career planning and counselling. In addition to organizational culture and managerial/organizational interventions, individual responsibility appears to be important. Self-management tactics and being in possession of stress coping skills are highly helpful when it comes to mitigating occupational stress as a knowledge worker.</p>		
Keywords/tags Knowledge workers, Occupational stress, Job performance		
Miscellaneous Appendices attached (4 pages)		

Tekijä(t) Koivusalo, Samuli	Julkaisun laji Opinnäytetyö, AMK	Päivämäärä 24.5.2020
		Julkaisun kieli Englanti
	Sivumäärä 59	Verkojulkaisulupa myönnetty: x
Työn nimi <b>Työstressin vaikutukset tietotyöntekijöiden työn suorittamiseen</b> Systemaattinen kirjallisuuskatsaus		
Tutkinto-ohjelma Degree programme International business		
Työn ohjaaja(t) Saukkonen, Juha		
Toimeksiantaja(t) JAMK Center for Competitiveness: Murat Akpınar		
<p>Tiivistelmä</p> <p>Työstressi on kohtalaisen hyvin ymmärretty ilmiö sen kaikkine haittapuolineen. Tutkimukset ovat osoittaneet, että työstressillä on negatiivisia vaikutuksia työntekijöiden työn suorittamiseen. Tämä tutkimus pyrki ymmärtämään ja tunnistamaan mitä vaikutuksia työstressillä on tietotyöntekijöiden työn suorittamiseen ja mitä olisi mahdollista tehdä työstressin lieventämiseksi. Tämän tutkimuksen kontekstissa työn suorittaminen määriteltiin kaikkina niinä suoraan tai epäsuorasti organisaation tavoitteiden saavuttamiseen vaikuttavina aktiviteetteinä, jotka tietotyöntekijä suorittaa työpäivänsä aikana.</p> <p>Systemaattinen kirjallisuuskatsaus suoritettiin tarkoilla kriteereillä ja valitut tutkimukset analysoitiin temaattisella analyysillä. Temaattisen analyysin tulokset näyttivät, että työstressillä on kaksi merkittävää negatiivista vaikutusta tietotyöntekijöiden työn suorittamiseen. Ensimmäinen negatiivinen vaikutus työstressillä osoittautui olevan tuottavuuden ja tehokkuuden heikentyminen. Toinen negatiivinen vaikutus työstressillä osoittautui olevan työhyvinvoinnin heikentyminen, joka puolestaan heikentää epäsuorasti työtehokkuutta. Tulokset myös viittaavat, että työstressiä voidaan lieventää parantamalla työkuultuuria, harjoittamalla henkilökohtaista vastuuta sekä esimiesten ja organisaatioiden interventioilla.</p> <p>Tulokset osoittavat, että työstressillä on haitallisia vaikutuksia tietotyöntekijöiden työn suorittamiseen. Tämän lisäksi tulokset osoittavat, että työstressin haitallisia vaikutuksia voidaan lieventää ja kontrolloida usealla eri keinolla mutta pääasiassa parantamalla organisaatioiden kulttuuria. Toisenlaisia tapoja työstressin lieventämiseen ovat esimiesten ja organisaatioiden interventiot, joita ovat esimerkiksi urasuunnittelu ja neuvonta. Henkilökohtaisella vastuulla näyttää myös olevan tärkeä merkitys. Henkilökohtainen vastuu viittasi itsensä johtamisen taitoihin. Tämän lisäksi, stressinhallintataitojen hallussapito osoittautui olevan hyvin hyödyllinen työstressin lieventämiseen tietotyöntekijänä.</p>		
Avainsanat Knowledge workers, Occupational stress, Job performance		
Muut tiedot Liitteet (4 sivua)		

## Contents

<b>1</b>	<b>Introduction .....</b>	<b>3</b>
1.1	Background .....	3
1.2	Motivation for the research .....	4
1.3	Research questions.....	5
1.4	Structure of the thesis .....	6
<b>2</b>	<b>Literature review.....</b>	<b>7</b>
2.1	Knowledge workers .....	7
2.1.1	Knowledge work versus manual work .....	8
2.1.2	Knowledge worker characteristics .....	8
2.2	Job Performance .....	10
2.2.1	Job performance versus productivity.....	11
2.2.2	Knowledge worker productivity.....	11
2.2.3	Determining knowledge worker performance .....	12
2.3	Occupational stress .....	13
2.3.1	Chronic versus acute stress .....	14
2.3.2	Stress and its effects on health .....	15
2.3.3	Occupational stress and job performance .....	16
2.4	Integration of the knowledge base.....	17
2.4.1	Defining key concepts.....	17
2.4.2	Current research consensus and addressing the gap .....	18
<b>3</b>	<b>Methodology and implementation .....</b>	<b>19</b>
3.1	Research approach .....	20
3.2	Research scope .....	21
3.3	Data collection.....	21
3.4	Data analysis.....	26

3.5	Verification of the Results .....	27
4	Results .....	29
4.1	Decreased job performance .....	30
4.2	Organizational, Managerial & Individual issues .....	35
5	Discussion .....	40
5.1	Answers to the Research Questions .....	40
5.2	Practical / Managerial Implications .....	42
5.3	Assessment of the results in the light of the knowledge base.....	42
5.4	Limitations of the research .....	43
5.5	Recommendations for the future research .....	43
	References.....	45
	Appendices .....	56
	Outlines of eligible studies .....	56
	Thematic analysis coding.....	58
	<b>Figures</b>	
	Figure 1 The characteristics of knowledge workers. (Zhan, Tang, & Zhang 2013, 558) 9	
	Figure 2 Layers of performance (Georgise, Seifert & Thorben 2013, 7). .....	12
	Figure 3 Pico model (Schardt, Adams, Owens, Keitz & Fontelo 2007).....	22
	Figure 4 Prisma Flow diagram (Moher, Liberati, Tetzlaff & Altman, 2009).....	25
	Figure 5 Thematic analysis process (Braun & Clarke 2006, 6). .....	26

# 1 Introduction

The purpose of this chapter is to briefly introduce the background, topic and research phenomena that was examined in this study. In addition, a brief explanation regarding the motivation behind the study, relevance of the study from the collective point of view and lastly a description of the thesis structure.

## 1.1 Background

We are living in a knowledge economy in which the greatest resource is now something intangible instead of something concrete like coal or timber. A knowledge economy is classified as an economy in which the key resource is knowledge. As a result, the primary driver of modern economic growth is dependable on knowledge workers' and in their ability to perform at their best possible level. (Houghton & Sheehan 2000, 2.) Therefore it is extremely important to understand the interconnectedness between occupational stress and the ability to perform at a high level. This study examined occupational stress and its effects on knowledge workers' job performance. Occupational stress is a fairly well studied phenomena and pre-existing literature mostly has a mutual consensus regarding occupational stress and its adverse effects. It is understood that occupational stress has unwanted implications on workers performance. Despite this consensus, a notable gap in the literature exists that this research attempted to rectify.

Most literature regarding occupational stress and its effects has primarily focused on what effects it has on a worker of any kind. Work that is classified as blue-collar work or more traditional work such as construction workers, waiters or shop-clerks sets different demands for employees than jobs that are classified as white-collar positions, such as architects, sales managers or lawyers. Great proportion of workers who occupy positions that are considered as white collar, can be further defined as knowledge workers. Knowledge workers' primary resource is their knowledge, expertise, information processing, analyzing and synthesizing capabilities. In addition, the process within knowledge work itself is often intangible. In blue collar and/or manual work, the demands for sufficient execution of job are more repetitive, simple and the

results and processes are often tangible. (Turriago-Hoyos, Thoene & Arjoon 2016). These major differences between traditional work and knowledge work calls for new scientific research that would primarily focus upon occupational stress and its effects on knowledge workers'. The cluster under study in this research were workers who are in an occupation that could be classified as knowledge work. Objectives of this research were to obtain a greater understanding and to identify streams within the pre-existing literature regarding occupational stress and its effects on knowledge workers' job performance and to conduct a systematic review and analyze eligible studies by a thematic analysis to answer the research questions.

## **1.2 Motivation for the research**

Peter Drucker in a California Review Management journal highlighted the absolute necessity for finding and developing means to increase the productivity of knowledge work and knowledge workers' stating that they will be the most valuable asset of any company in the 21<sup>st</sup> century (Drucker 1999). The primary reason as to why I chose to study and research this phenomenon is because knowledge work has grown at a rapid pace and the growth is only going to increase exponentially in the years to come. According to a leading global management consulting company McKinsey & Company, there were already 230 million knowledge workers' in 2012 and the occupation has seen an annual increase of 1.9 million per year. (Brody 2018.) Necessity for research regarding this topic is high, when considering the inevitable rise in knowledge workers', the different demands that knowledge work requires and the gap in research that would examine the effects of occupational stress on knowledge workers' job performance. According to Brinkley & Fauth (2009) The pendulum shifted towards a more knowledge-based economy in the last forty years by a change towards higher value-added industries such as technology. A major shift from traditional material assets such as machinery equipment and buildings to intangible counterparts such as human capital and software also increased the pace of this change. In addition, the number of employees in the workforce with higher levels of qualifications has increased since the last four decades, which means that more and more

people are in possession of the skills and the knowledge required to partake in knowledge work (5.)

The inevitable rise in knowledge work accompanied with the increase in automation that is going to further decrease the need for manual labor is going to drastically change the dynamics of working environments. It is up most of importance that knowledge workers are in a position in which they are able work and perform at levels in which their contribution is maximized. Mitigating downsides often produces greater results than focusing on further improving what already works, thus identifying possible negative outcomes of occupational stress and then taking proactive measures in offsetting occupational stress may have big positive outcomes if actions are taken on a collective level. Despite these rapid innovations and all the good that they bring, a flipside to the coin exists. Human beings are not able to advance and keep up with the pace. Human physiology and the stress response are still the same as they were forty years ago but the working environments and the demands of working life are not.

### **1.3 Research questions**

This research aimed to obtain a better understanding of occupational stress and its effects on knowledge workers' job performance and to assess what possibilities exist that could be helpful in the mitigation of occupational stress. The objectives of this research were to

- To obtain deeper understanding of occupational stress.
- To identify the dominant streams of scholarly literature related to occupational stress and its effects on knowledge workers' job performance.
- To find potential ways to mitigate occupational stress.

In order to meet these objectives, the following research questions were set for the study;

- A. What effects does occupational stress have on knowledge workers' job performance?
- B. How can occupational stress be mitigated?

Qualitative research methods were used to answer the research questions. This research utilized exclusively secondary data. Data collection was performed as a systematic review and a thematic analysis was performed to analyze the data. Two notable reasons exist as to why this research only focused on secondary data as opposed to primary data from interviews or questionnaires. First reason being that the participants themselves would've needed to evaluate their exposure to occupational stress and its possible effects on their job performance. Evaluating these aforementioned factors is difficult and poses a great risk for the integrity of the data. Second reason being is that acquiring sufficient amount of data would've proved to be problematic considering the time and resource constraints of a bachelor thesis.

#### **1.4 Structure of the thesis**

This thesis consists of five individual chapters. Chapter one being the introduction chapter. Chapter two is a literature review that aims to explore and define the key concepts of this research alongside with previous research. Chapter three explains the research methodology of this research. In chapter four the results from the empirical part of the study will be showcased. Lastly, in chapter five the findings will be summarized and answers to the research questions will be provided alongside with discussion regarding the main implications of the findings, limitations of the study and suggestions and possibilities for future research.

## 2 Literature review

The primary goal of the literature review is to provide the reader an introduction to the key concepts and to familiarize the reader with the pre-existing literature regarding the topic. Final part of the literature review includes a section that integrates the knowledge base in to the empirical part of the study and defines the key concepts.

### 2.1 Knowledge workers

Knowledge work as a term was first introduced by a management consultant named Peter Drucker in 1959 (Palvalin 2019, 1). The creation and evolution of economies based on knowledge sparked a high concentration of knowledge intensive organizations and as a result this increased the demand for knowledge workers. A rough definition of the term is that a knowledge worker is anyone whose primary focus is to utilizes one's own knowledge and incorporate it for the benefit of a company. (Henry 2012, 2.) Knowledge workers are in possession of greater rights and powers to be in control of their work. This distinction also makes knowledge workers' more responsible for their work. (Zhan, Tang & Zhang 2013, 557-564.) Knowledge workers are seen as the core of competitiveness of an organization in a knowledge economy.

Knowledge workers are involved in the creation, distribution and application of knowledge. Knowledge workers' own expertise, knowledge and skills makes knowledge workers' the means of production of a given organization (Dul, Ceylan & Jaspers, 2). This means that knowledge workers are in possession of a greater bargaining power than their manual worker counterparts. These views are also supported by Mladkova (2012) who summarized that knowledge workers' main tool in a working scenario are their brains, therefore losing a knowledge worker also means the loss of knowledge capital (243-250).

### **2.1.1 Knowledge work versus manual work**

Key distinction between knowledge work and other types of work is that knowledge workers primarily utilize intangible resources as their primary assets during work. A clear line that would clearly distinguish knowledge workers from manual workers is still rather unclear as many jobs include elements of both. One definition of a knowledge worker is someone who converts knowledge from one form to another rather than converting physical materials from one form to another. (Palvalin 2019, 3.) Knowledge workers are seen as knowledge generators, knowledge workers contribute most effectively to the performance of a knowledge society as knowledge workers' own the tools of production. Knowledge society is a term that describes societies that are economically and culturally characteristic by a great degree of dependency on their potential ability to contribute on the creation of scientific and technological knowledge. (Turriago-Hoyos, Thoene & Arjoon 2016.) Based on these findings, the simplest distinctive factor that could be used to define the differences between knowledge work and other types of work is that knowledge work refers to work in which the primary resources and processes are intangible. On the contrary, in manual work, the processes and resources are tangible.

### **2.1.2 Knowledge worker characteristics**

Some characteristics of a knowledge worker may include, high commitment to profession, autonomy, driven by self-fulfillment, sensitivity to peer group assessment and mobility (Miadkova, Zouharova & Novy 2015, 768-776). Many different characteristic presuppositions exist, however as knowledge work is still a term that is not that well understood, a meta-analysis was conducted by Hong Zhan and colleagues to pinpoint and describe the specific characteristics of knowledge workers. Similar characteristics were distilled in to ten categories that best describes knowledge workers' characteristics.

Rank	Frequency(†)	Characteristics	Jiang <i>et al.</i>	Lin	Peng
1	45	Independence	√	√	√
2	39	High level of turnover	√	√	√
3	30	Creativity			
4	30	Being difficult to supervise the work processes		√	√
5	29	Realizing self-value	√	√	
6	26	Being difficult to measure the work results		√	√
7	23	Knowledge capital		√	√
8	15	Dimly bounds of leadership and being contemptuous of the authority		√	√
9	13	Being loyal to the occupations instead of employers	√		√
10	13	Individual characters		√	

Figure 1 The characteristics of knowledge workers. (Zhan, Tang, & Zhang 2013, 558)

Other researchers have distilled the aforementioned knowledge worker characterizations into job complexity, information processing, skill variety, problem solving, skill utilization and job specialization (Hernias & Mikullic 2014, 271). Obtaining a clearer understanding of all the characteristics of knowledge workers is important, as it would enable greater allocation of resources to the most important factors. The most valuable asset of a company in the 20<sup>th</sup> century was its production equipment and the most valuable asset of a company in the 21<sup>st</sup> century are the knowledge workers' and their productivity. The most important contribution that management has to make in the 21<sup>st</sup> century is to find ways and solutions that will increase the productivity of knowledge workers. (Drucker 1999, 79.) Knowledge work is a dynamic term that still does not have an established clear and specific definition as to how the term is categorized and what is meant by it and because of this, the research focuses on the main select few criteria's that make up the term. A knowledge worker in this research is defined as someone who provides value to an organization primarily utilizing one's own expertise and knowledge in a manner that the process and nature of work is intangible, for example an architect, a software developer or a sales manager.

## 2.2 Job Performance

Job performance is defined as the total amount of value that an individual is expected to deliver to an organization over a set period of time. Performance is tied to behavior as performance is derived from behavior that is repeated over a long period of time thus job performance is best characterized as the productive behavior of an individual during time spent at work. (Motowidlo & Harrison 2012, 92.) Job performance refers exclusively to behaviors that on their own or indirectly makes a difference to organizational goal achievement.

Job performance can be further divided in to two primary categories which are task and contextual performance. Task performance is defined as the completion of the specific tasks which are assigned by a superior, whereas contextual performance is defined as the activities that indirectly enhances the likelihood of meeting organizational objectives. (Díaz-Vilela, Delgado Rodríguez, Isla-Díaz, Díaz-Cabera, Hernandez-Fernaud & Rosales-Sanchez 2015.) Counterproductive work behavior is also taken in to account when discussing job performance. Counterproductive work behavior is defined by actions and behavior that results in undesirable consequences for the organization or its stakeholders (Campbell & Brenton 2015, 51). A framework for individual job performance was created in the 1980s and has since been updated and revised by Campbell (2012). In the framework individual performance in a job role is categorized by the following eight factors. (ibid., 54.)

1. **Technical performance:** Competence within given field.
2. **Communication:** Ability to communicate in a proficient and clear manner.
3. **Initiative, persistence and effort:** Proactive working approach and conscientiousness.
4. **Counterproductive work behavior:** Actions don't have a negative effect on organizational goals.
5. **Supervisory, managerial, executive leadership:** Ability to take initiative.
6. **Hierarchical management performance:** Ability to manage and make best use of organizational resources.
7. **Peer leadership performance:** Ability to perform well within a team environment.
8. **Peer management performance:** Ability to work efficiently as a collective.

### **2.2.1 Job performance versus productivity**

Job performance and productivity are not synonymous with each other; however, performance measures do give insights of a worker's productivity levels. Productivity can be defined as the ratio between a measure of output and a measure of input. Productivity can therefore be rather accurately measured as an output of any kind such as the amount of sales or units manufactured relative to an input, for example the number of hours worked or the price of labor. (Sauermann 2016, 2.) Organizational success relies on the productivity of its employees thus employee productivity has become an extremely vital objective for businesses globally (Hanaysha 2016, 3). Employee productivity in organizational contexts depends on three main factors which are; Possibility to do the work, ability to exert sufficient effort and the amount of support given. A broader definition of productivity states that productivity is all those actions that drives a company closer to its established goals. (Ekiabor 2019.)

### **2.2.2 Knowledge worker productivity**

Pre-existing literature primarily looks at the productivity and performance of the manual workforce and what factors influences that as opposed to knowledge workers. This is problematic because a measurement of productivity differs dramatically between the two because the resources and outputs in knowledge work are intangible. (Ramirez 2004, 624.) Assessing, evaluating and controlling knowledge workers' productivity is hindered by the five following concerns.

1. Knowledge workers themselves have to plan their tasks.
2. Knowledge workers have to manage themselves and practice complete autonomy.
3. Knowledge work requires never-ending innovation and learning.
4. Knowledge workers have to structure and plan the quality of their output themselves.
5. Knowledge workers' productivity requires that the worker is perceived and treated as an asset rather than a liability. (Lazzolino & Laise 2018, 4.)

### 2.2.3 Determining knowledge worker performance

As job performance is also a vague expression which is prone to different interpretations depending on the context, it is important to formulate a definition that will be utilized and referred to in this research. Determining knowledge workers' performance is made more difficult because traditional key performance indicators (KPIs) are inappropriate when it comes to managing and evaluating knowledge workers' performance (Zhu 2017). Knowledge workers' productivity can be best assessed by investigating three variables and their relationships, these three are Inputs, processes and outputs. The main input of a knowledge worker is their intellectual capital. (Ruostela 2012, 26.) Based on the literature, it can be witnessed that job performance and employee productivity are interrelated concepts that has a positive correlation.

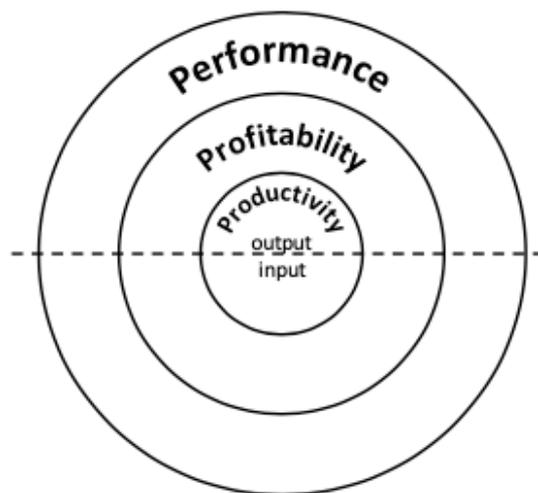


Figure 2 Layers of performance (Georgise, Seifert & Thorben 2013, 7).

Due to this interrelatedness between job performance and productivity and the lack of a specific criteria that would define knowledge workers' job performance, this research will define knowledge workers' job performance as; All the actions performed that on their own or indirectly produces value to an organization in any way. Negative job performance is defined as all those things that are detrimental to the aforementioned description.

### 2.3 Occupational stress

Occupational stress refers to stress that is related to one's occupation that originate from factors related to work. Current understanding of occupational stress is that it can occur when there is a mismatch between the requirements and/or demands of the workplace and an individual workers ability to carry out and execute these demands. (Narban, Narban & Singh 2016, 47.) According to Mosadeghrad (2014) occupational stress is derived from variables such as individual, organizational and environmental factors, in addition the occupation itself with its responsibilities, requirements and heavy workloads contributes to the amount of occupational stress an employee is exposed to. (225.) Occupational stress is an identified and known health risk that has adverse health implications on psychological, behavioral and medical diseases. Individual differences are great, and everybody has a unique stress response. (Quick & Henderson 2016, 459.) According to a study by Bhui & Dinos & Miecznikowska, De Jongh & Stansfeld (2016) significant drivers of occupational stress are low control but high demand situations, imbalances between effort- reward ratio and working conditions. (318-325.)

Current literature regarding occupational stress portrays a view of occupational stress that could be understood in a manner that implies occupational stress to be one category of stress as opposed to a completely different distinct phenomenon. Therefor occupational stress can be better understood as the occurrence of a stress response, either acute or chronic in nature that happens during work time. The aforementioned view of occupational stress is further supported by a study by Mustafa, Illzam, Muniandy, Hasmi, Sharifa & Nang (2015) which states that occupational stress can be defined as the alteration in a physical or mental state in response to a change in workplace environment (98). In the light of the literature, occupational stress can be understood as a factor or a variable that triggers the stress response of an individual within a working environment context. For this reason, when considering occupational stress, it is important to understand the stress phenomena as a whole.

### 2.3.1 Chronic versus acute stress

Stress is a very studied phenomena and yet a simple and definitive definition of the word doesn't exist, rather multiple definitions on contextual basis. In medical or biological context stress is defined as a physical, mental or emotional factor that can affect bodily or mental functions. Based on this definition, stresses can originate from two different sources which are external sources (environment) and internal sources such as an illness. (Shiel 2018.) Stress is considered as an umbrella term and the definition of the word is prone to different interpretations depending on the situation it is used upon, therefore it is important to distill all the definitions of the phenomena and concise them in to an understandable and coherent format which will be frequently revisited in this research.

The following definition of the word will be utilized from this point onwards; Stress is a bodily reaction to any alteration which requires a response, regulation and/or physical, psychological and/or emotional adaptation. (Shahsavarani, Abadi & Kalkhoran 2015, 233.) Stress can further be divided in to two different categories which are chronic and acute stress. Chronic stress refers to situations in which the stress response proceeds to be activated. Acute stress on the other hand is a stress response to a stimulus within the immediate environment that diminishes rather quickly after the stressor is no longer present. (Hammen, Kim, Eberhart & Brenan 2009.)

Chronic stress occurs when the human body is unable receive a clear signal to return to baseline level of functioning and on the long term this can have adverse health effects on bodily systems such as digestive, cardiovascular and reproductive systems. Chronic stress and its effects on human health has been researched and numerous population studies have showcased links between chronic stress and poor mental and physical health. (Quinlan, Tu, Langlois, Kapoor, Zielger, Fahmi & Zunzunegui 2014.)

### 2.3.2 Stress and its effects on health

Extensive literature has showcased a correlation between stress and both beneficial and harmful effects while leaning heavily more on the harmful side. Beneficial effects of stress have to do with the maintenance of homeostasis which in return leads to higher likelihoods of survival. The adverse effects of stress, specifically chronic stress outweigh the positive effects. Chronic stress has a major role in exacerbating negative health effects such as different pathological conditions and diseases by disrupting the immune system. (Arlberg, Panahi, Sahraei, Johnston & Sahebkar 2017, 8.)

During chronic stress an exhaustion of the body's capacity for an appropriate reaction can lead to far lasting immunological dysfunctions which can have serious ramifications on overall health and quality of life (Mina, Milota, Zeljko & Kristina 2019, 97). Over a prolonged period of chronic stress, the body undergoes a chronic hypersecretion of glucocorticoids which may reduce the volume of the hippocampus and the hypothalamus. Chronic secretion of cortisol alters the functioning of the immune system and as a result is a big risk factor for diseases such as autoimmune disorders. In 2017 the world health organization (WHO) made a statement that for 60% of known diseases one of the causes is stress. Alongside with adverse physical health outcomes, chronic stress is also associated with many mental disorders. (ibid., 98.)

Brain is the fundamental organ that perceives and determines whether or not the signal that is received is classified as threatening for the maintenance of homeostasis or not. The human brain possesses an ability to showcase functional and structural plasticity as a response to stressful encounters. Brain plasticity refers to the brain's ability to change and make adaptations based on previous experience. (Mceven 2017.) Chronic stress may cause imbalances in the brain's neural circuitry and this can have adverse outcomes on cognition, decision making, anxiety and mood (ibid.,) Previous studies have confirmed a negative correlation between chronic stress and cognitive functioning in humans. Functioning that requires operation from the prefrontal cortex and the hippocampus are impaired by chronic stress. Great individual variances in stress tolerance has been recorded, main differentiators being gender and age. Both acute and chronic stress has been showcased to impair performance on tasks requiring high cognitive ability. (Sandi 2013.)

### 2.3.3 Occupational stress and job performance

Studies have shown that occupational stress has adverse effects on employee performance. Multitude of factors such as workload, role conflict and insufficient monetary rewards have been shown to increase occupational stress which in turn has worsening effects on employee performance (Celine 2018, 11). Some evidence suggests that if the presence of stress does not diminish then the likelihood of decreased performance and increased absenteeism is probable. This finding would showcase a notable adverse correlation between occupational stress and decreased performance. (ibid., 12.)

Stress response has been recorded to be associated with a loss of functional processing capacity. Loss of capacity impacts performance in two different ways, short term and long term. In the short-term, stress can impair immediate performance through overload of attention which may result in subpar ability to perform. In the long term (chronic) stress can impair the cognitive functioning of the brain and as a result affect performance. (Matthews, Lin & Wohleber 2019, 3.)

A 2005 meta-analysis by Gilboa and colleagues regarding stress and performance at work concluded that all the stress-performance relationships that were examined were negative. Conclusion of the meta-analysis states that future research regarding stress-performance relationship should be targeted specifically on particular stresses and dimensions of job performance. (Gilboa, Shirom & Fried 2005, 3.) This statement further reinforces the position of current research regarding stress and performance. Currently it primarily consists of literature regarding acute stress/stressors and their effects on the job performance of a worker of any kind as opposed to occupational stress and its effects on knowledge worker's job performance. The aforementioned Meta-analysis had a significant sample size of nearly 40 000 employees.

## **2.4 Integration of the knowledge base**

This chapter summarizes the literature review and draws the findings together to make a sound basis for the data analysis by defining the key concepts and addressing the current gap in the literature based on the current consensus regarding occupational stress, knowledge workers and job performance.

### **2.4.1 Defining key concepts**

Key concepts that this thesis focuses upon are “Knowledge worker”, “Job performance and “Occupational stress”. All of these three terms are such that definitive precise definitions are hard to establish, therefore it is important to establish strict definitions of the concepts that this thesis will focus on.

#### **Knowledge worker**

Knowledge worker is defined as a worker who provides value to a company or an organization primarily utilizing one’s own expertise and knowledge in a manner that the process and nature of work is intangible. This definition is supported by Brown (2017) who wrote that a knowledge worker is someone who adds value to an organization through their knowledge, ideas, analyses and syntheses (125).

#### **Job performance**

Job performance is defined as all the behaviors that a knowledge worker acts upon during working hours that on their own or indirectly provides value to an organization and enhances the likelihood of meeting organizational goals. (Motowidlo & Harrison 2012).

#### **Occupational stress**

Occupational stress is defined as the occurrence of stress response on an employee, either in acute or chronic manner which is caused by factors related to occupation. (Haradhan 2012, 3).

### 2.4.2 Current research consensus and addressing the gap

Extensive literature regarding stress and its effects on job performance exists and most of them came to the same conclusion which is that stress has adverse effects on job performance. Stress has been shown to have a significant correlation with negative task performance (Akter 2012). Studies on occupational stress have showcased it to be a costly problem for employees and a big problem for organizations as it is linked with decreased productivity and increased absenteeism (Ratnawat 2014). Sufficient amount of evidence regarding occupational stress and its effects on knowledge workers' performance is lacking, however literature suggests that stress has adverse effects on working memory. Cortisol, a stress hormone that is elevated during chronic stress has been linked to be disruptive to working memory which could have negative implications on the performance of knowledge workers. (Staal 2004, 51-54.) According to Sapolsky (2004) chronic stress may become a worse detriment to overall health than the stressor itself, including increased muscle atrophy, fatigue and increased risk for multiple negative health conditions. Acute stress responses are considered as essential, however chronic stress is seen as a pathogenic. (395.) Previous literature has clearly indicated the negative attributes of stress and its implications on job performance; however, literature is lacking that would show how these findings would apply to knowledge workers and their performance.

In a knowledge society tangible asset are no longer the most valuable, instead the most valuable assets are intellectual capital and intellectual capital is synonymous with cognitive abilities (Pagani, Pilatti & Carvalho 2009). As stress has been linked with decreased cognitive abilities and the future of work relies heavily on knowledge workers' ability to perform at an optimal level, a phenomenon worth researching has been established. As knowledge worker's performance is heavily influenced by proper cognitive functioning and chronic stress has been shown to be a detrimental factor to cognitive function, new research is paramount. The research gap that this thesis attempts to fill is to steer the current research regarding occupational stress and performance to include knowledge workers as opposed to workers of any kind.

### **3 Methodology and implementation**

The research topic is broad, novel and lacks previous specific research. The nature of the topic is such that any attempts to utilize primary data in forms of surveys or questionnaires would prove to be problematic for the following reasons; Research participants would have to self-assess whether or not they've actually been exposed to occupational stress and what effects it could possibly have had on their job performance. In addition, acquiring sufficient and reliable data in the constraints of current resources would've proved to be troublesome. For this reason, a systematic review was seen as the best possible alternative that would ensure a sufficient sample size with good reliability. A systematic review includes a detailed and thorough plan and search strategy for data that reduces the risk of bias by identifying, assessing and synthesizing all relevant studies on a specific topic. A systematic review is constituted of 8 stages which are formulating the review questions, defining inclusion and exclusion criteria's, developing a search strategy to locate studies, selection of studies, data extraction, assessment of study quality, analyzing and interpretation and lastly presentation of findings. (Uman 2011.)

The remaining eligible studies will be subject to a thematic analysis, which is a data analysis method that helps in identifying and reporting re-occurring patterns within a given dataset. (Braun & Clarke 2006, 8). Purpose of this research is to gauge the relationship between occupational stress and job performance of knowledge workers by conducting a systematic review and performing a thematic analysis to answer the research questions. The relevance of this study is both theoretical and practical as it attempts to bring more understanding to a topic that has not yet been under much review and make suggestions for future research.

### 3.1 Research approach

Research can be categorized in to two main categories, qualitative and quantitative research. Qualitative research is more commonly used when it comes to exploring the meaning and implications of people's experiences, cultures and individuals' personal views on particular issues. Quantitative research is utilized to examine the relationships between different variables such as, independent, dependent and extraneous variables. (Elkatawneh 2016, 2.) Qualitative research attempts to create themes based on different sources such as interviews, observations or documents and is classified as inductive by nature. Quantitative research analysis is based on the use of statistics to manage numbers and attempts on trying to understand what the numbers might mean in terms of answering the research questions. (ibid., 4.) Qualitative research is a more appropriate method for this research, as the aim of this study was to understand the effects of occupational stress on knowledge workers' job performance by conducting a systematic review.

A systematic review uses explicit methods to identify, select and critically assess relevant past research from studies that have been published previously that are related to the research question at hand. A systematic review is an effective way to reduce the risk of bias interfering with the study by only selecting studies that correspond with specific criteria that ensures reliability and validity. (Ham-Baloyi & Jordan 2016.) Systematic reviews are considered to be of more quality and more comprehensive as other types of literature reviews as systematic reviews are characterized to be more methodical, coherent, transparent and replicable. (Siddaway, Hedges & Wood 2019, 9.) Individual studies are rarely definitive as of themselves, thus a systematic review is able to synthesize and evaluate multiple studies at a better validity to get a greater and more precise understanding of the topic at hand (ibid., 10). Systematic review was utilized in this research due to the fact that the nature of research is such that any means or attempts at the use of primary data in forms of action research, surveys or questionnaires would impose a risk on the integrity of the research and secondly due to resource and time constraints.

### **3.2 Research scope**

Workers or any individuals who are occupying working positions that could be classified as being knowledge work were the primary targets under research. Positions that could be classified as knowledge work are growing rapidly, thus it is important to understand all the factors that could be detrimental to knowledge workers' ability to perform. This research attempted to understand what effects occupational stress has on knowledge workers' job performance and secondly to understand what could be done to combat the adverse effects of occupational stress.

### **3.3 Data collection**

A systematic review has five individual steps which are; Framing questions for a review, identifying relevant work, Assessing the quality of studies, compiling and summarizing the evidence and lastly interpreting the findings. (Khan, Kunz, Kleijnen & Antes 2003.) Systematic reviews can follow a framework known as PRISMA which stands for preferred reporting items for systematic reviews and meta-analyses. The PRISMA framework consists of a 27-item list and a four-phase flow diagram that assists in the extraction of reliable data. (Moher, Liberati, Tetzlaff & Altman 2009.) Prisma flow diagram was utilized in this research. The data collection began by a preliminary overview of the pre-existing data, after which key words were chosen and the systematic review took place. When conducting systematic reviews, a framework known as PICO is often utilized to formulate research problems and questions into a coherent format. PICO is an abbreviation for patient, intervention, comparison and outcome. (Schardt, Adams, Owens, Keitz & Fontelo 2007.) PICO was utilized in the problem statement formulation in this research.

### Pico model

<b>Patient, Population or Problem</b>	Knowledge workers
<b>Intervention, Prognostic Factor or Exposure</b>	Occupational stress
<b>Comparison or intervention (If appropriate)</b>	None
<b>Outcome that is measured or desired</b>	Job performance

Figure 3 Pico model (Schardt, Adams, Owens, Keitz & Fontelo 2007).

### Keywords

Before starting a systematic review it is important to pick specific keywords so that finding appropriate studies is as accurate, efficient and replicable as possible. However, as the amount of scientific literature in online databases is very large, it is also worthwhile to make searches on alternative keywords that are synonymous with original keywords. Increasing the scope by using synonyms increases the odds of finding desired studies. (Cochrane 2019.) For this reason, different keywords were added to increase the odds of finding studies that in nature discuss occupational stress, knowledge workers and performance but are showcased with different terminology. Keywords that were chosen in this research are;

Occupational stress	Knowledge work	Job performance
Chronic stress	Knowledge workers	Performance
Stress	Managerial work	Productivity

Keywords were intertwined with words such as: “And”, “It’s”, “Effects”, “Implications”, “On”. For example, Occupational stress and its effects on knowledge workers’ job performance.

### **Inclusion and exclusion criteria**

In order to be able to pick appropriate data when conducting a systematic review, it is important to establish proper inclusion and exclusion criteria. Inclusion criteria are defined as those key features that have to be present within a study that makes it an appropriate piece of literature as defined by your own standards. Exclusion criteria are the opposite and studies that fit in to the predetermined exclusion characteristics will be dismissed. (Patino & Ferreira 2018.)

<b>Inclusion criteria</b>	<b>Exclusion criteria</b>
Free access	Study is behind a paywall
Study conducted after year 2005	Study conducted earlier than year 2005
Study addresses knowledge workers	Study addresses other than knowledge workers such as manual workers
Study addresses occupational stress	Study addresses momentary and acute factors such as workplace accidents
Study addresses job performance	Study does not address job performance

## Data extraction

Data search was done in the spring of 2020. The systematic review began with a big overhaul of possible online journals and databases. This was done to create a funnel that helped in assessing all possible options and to be able to narrow down to databases that would be most suitable for this particular systematic review. Preliminary screening and searching was conducted in various databases and many different keyword variations were used, such as “occupational stress and job performance”, “stress and job performance”, “stress and knowledge workers’ job performance”, “stress and its effects on productivity”, “knowledge work”, “chronic stress”, “job performance”, “occupational stress and knowledge workers” and many more different variances with the aforementioned keywords

The preliminary search was able to eliminate 30 different databases to 12 potential databases that showcased high relevance to the research at hand. The remaining twelve database were subject to another assessment, this time the use of keywords was more specific and followed the aforementioned keywords showcased in page (22) also titles and abstracts of the studies within the databases were thoroughly analyzed which assisted in further elimination of databases whenever a database was shown to not include desired data. After these two preliminary assessments, a thorough systematic review was conducted in the remaining eligible databases which were: ProQuest ABI / INFORM & Asian & European Business Collection. EBSCOhost, Janet FINNA, Google Scholar and ResearchGate. Data screening process is showcased below by utilizing PRISMA flow diagram.



**PRISMA 2009 Flow Diagram**

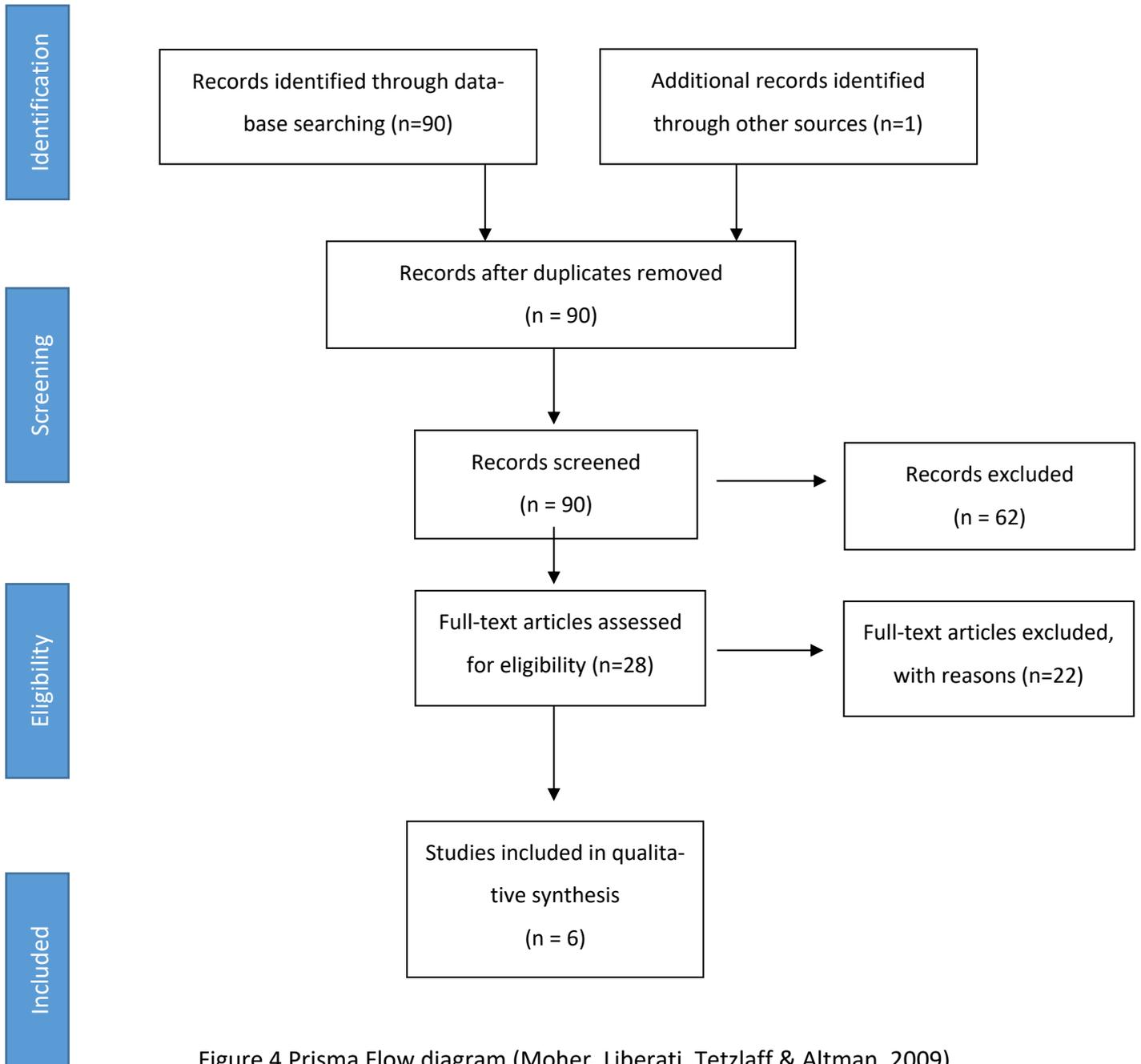


Figure 4 Prisma Flow diagram (Moher, Liberati, Tetzlaff & Altman, 2009).

**Eligible studies by source**

<b>ProQuest ABI (3)</b>	<b>ResearchGate (2)</b>	<b>Google scholar (1)</b>
-------------------------	-------------------------	---------------------------

### 3.4 Data analysis

The six remaining studies that were selected with strict criteria were subject to a thematic analysis. A thematic analysis is a method that assists in identifying, analyzing and reporting patterns and themes within a given dataset. Thematic analysis minimally organizes and explains a given data set in high detail. (Braun & Clarke 2006, 6.) The primary goal of a thematic analysis is to locate, identify and critically assess patterns that are re-occurring within a dataset and then categorize the findings in to themes (Maguire & Delahunt 2017). According to Braun & Clarke A thematic analysis is made up of six individual phases as shown below (2006).

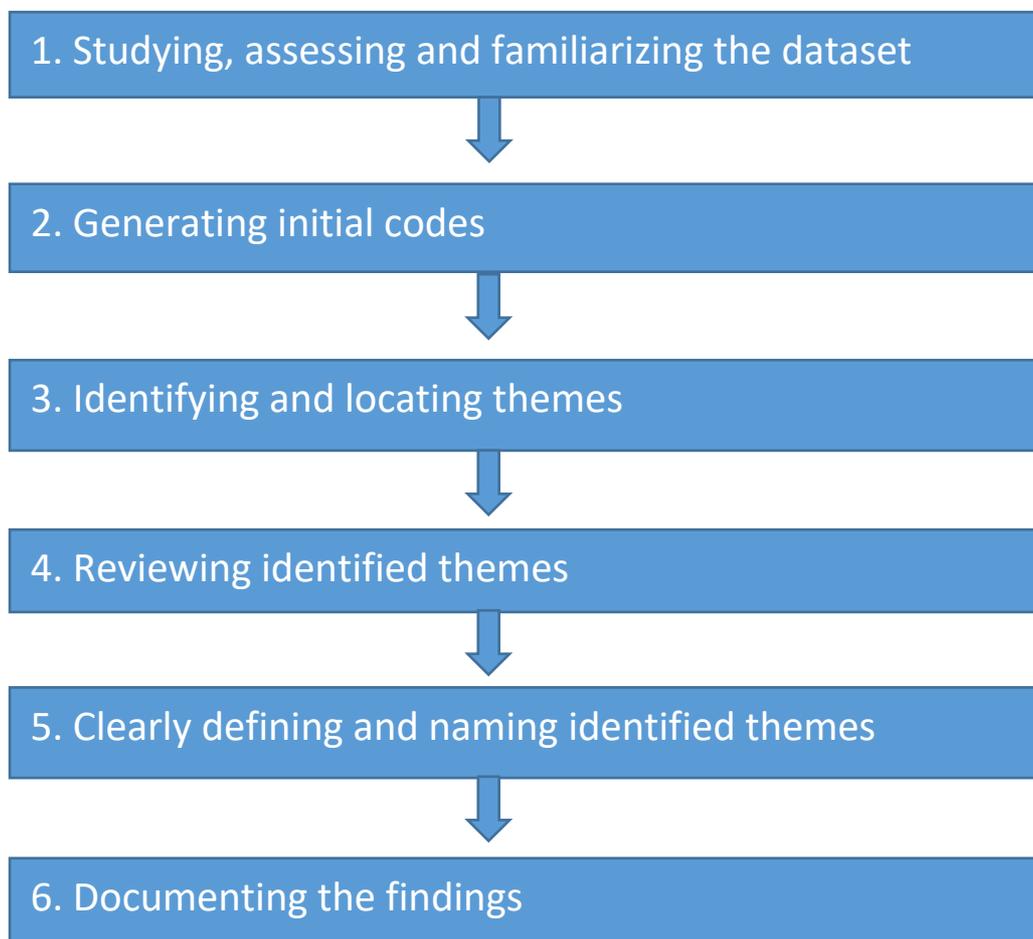


Figure 5 Thematic analysis process (Braun & Clarke 2006, 6).

### **Thematic analysis process**

Following the steps according to Braun & Clarke's framework, the thematic analysis process first began by thorough reading and evaluation of the literature which meant that the dataset was read and reread multiple times to truly get a wholistic view of the data. Microsoft excel was utilized in the collection of re-occurring factors upon which coding and categorizing to themes was built upon. After thorough assessment and complete understanding of the literature, the coding phase began which meant that the literature was read with the intent to highlight and identify sections that were made of attributes that were relevant. After going through the data and codifying re-occurring factors, the codes were collected, evaluated and assigned to sub-themes. Creating sub-themes before the formulation of main themes assisted in getting a more thorough understanding of the data. Themes are a broader category that represents many individual codes that share the same nature. After the themes were established, they were compared to the original dataset to further evaluate and assess, if the afore established themes truly correspond to the datasets. The themes proved to be highly reflective of the nature of the data, thus the following step was to correctly define and name the themes. Results from the thematic analysis are showcased in the results chapter and the overlay of eligible studies can be found in the appendix section.

### **3.5 Verification of the Results**

Verification of results refers to the process of checking, confirming and taking measures to evaluate whether or not the methods utilized to acquire the results are trustworthy. Verification of the results is assessed through four individual lenses which are internal and external validity, reliability and objectivity. (Morse, Barret, Mayan, Olson & Spiers 2002.)

**Internal and external validity of findings**

Validity of study refers to the integrity and precision in which the results of the study correspond with the actual data (Noble & Smith 2015). Study validity includes two sides: internal and external (Patino & Ferreira 2018). In this particular systematic review, the findings provide clear and interpretable answers to the research questions. The nature of the phenomena under study in conjunction with the results, it is highly likely that the results would apply elsewhere in similar contexts at least to a certain extent. However, as this study only took into account knowledge workers, it can only be speculated whether or not the findings from this study could be generalized to manual workers, namely due to notable differences in the natures between knowledge and manual work.

**Reliability of findings**

The findings from this systematic review are such that should other researchers conduct a similar study, the findings would be relatively if not precisely similar. Secondary data that was utilized in this research can be classified as sufficiently reliable, primarily consisting of new systematic reviews and case studies. The systematic review and the data collection methods followed previously tested and proven frameworks such as PRISMA flow diagram and PICO framework.

**Objectivity**

Any attempts to draw conclusions from the same dataset by other researchers would with positive likelihood come to the same findings, however the possibility of bias is always present due to the fact that in a thematic analysis the researcher has to interpret the codes and themes in a manner in which subjectivity is present. Data analysis techniques followed the thematic analysis guidelines as shown by Braun & Clarke in their 2006 publication.

## 4 Results

Results from this systematic review are representative of the underlying understanding that this research was conducted upon which was that occupational stress has undesirable effects on knowledge workers' job performance. Considering the objectives of this research, it is reasonable to say that answers to the research questions has been established. This results section aims to describe and showcase the findings that were acquired. The showcasing of results is guided by the research questions, however this chapter does not give definitive answers to research questions, instead the answers to the research questions can be found in the discussion chapter.

Objectives of this research were;

- To obtain deeper understanding of occupational stress.
- To identify the dominant streams of scholarly literature related to occupational stress and its effects on knowledge workers' job performance.
- To find potential ways to mitigate occupational stress.

In order to meet these objectives, the following research questions were set.

- A. What effects does occupational stress have on knowledge workers' job performance?
- B. How can occupational stress be mitigated?

The findings highlight that occupational stress is a clearly identified problem and it has adverse implications on knowledge workers' job performance in significant ways. Decreased job performance, job satisfaction, wellbeing and an increased risk of job absenteeism. In addition, mitigating the adverse effects of occupational stress is possible with proper organizational culture alongside with individual and managerial responsibility. The results from the systematic review will be showcased by firstly discussing the main themes and then showing the constituent parts that make up the main themes which are the subthemes. In the interest of conciseness, the codes which the sub and main themes were derived from can be found from appendices.

#### 4.1 Decreased job performance

<b>1<sup>st</sup> Research question</b> What effects does occupational stress have on knowledge workers job performance?	
<b>Themes</b>	<b>Sub-Themes</b>
<b>Decreased all around job performance</b>	>Decreased productivity, creativity and job efficiency >Decreased perception of control and job motivation
<b>Decreased occupational wellbeing</b>	>Decreased job satisfaction >Decreased occupational wellbeing >Increased likelihood of absenteeism and resignation

Clear trends were possible to be identified during the thematic analysis. In this research job performance was defined as all those actions that a knowledge worker does that on their own or indirectly increase the likelihoods of reaching organizational goals. The findings showcase clearly that occupational stress has a dose dependent effect on job performance, meaning that higher amounts of occupational stress correlates with more adverse effects on job performance. Whilst conducting the thematic analysis two main themes were identifiable which both implied a detrimental implication on job performance. First main theme being decreased all-around job performance. Second identifiable main theme was decreased occupational wellbeing. Despite occupational wellbeing not having a direct implication on job performance, decreased occupational wellbeing was correlated with decreased job performance.

### **Decreased all around job performance**

The sub-themes out of which the main theme “decreased all around job performance” was created upon are highly inter-related. As knowledge workers were exposed to occupational stress, their job efficiency decreased which meant that their ability to utilize given resources in a best possible manner was hindered. In addition to decreased efficiency, decreases in productivity were seen which meant that knowledge workers were in a position in which their ability to perform their duties was affected negatively also. The factors that were present in every single study out of the six studies that were chosen for this thematic analysis were the mentions of decreased productivity and/or efficiency in one way or another. Occupational stress had undesirable ramifications on knowledge workers’ ability to partake in their work in a productive manner. According to Tulsee (2015) productivity was considered to be at its peak when moderate level of stress was present, however a certain threshold existed and any further stress past the threshold decreased productivity at a rapid rate. On the contrary a certain level of occupational stress had slight positive effects on knowledge workers’ performance also only to a certain limit. (51-56.) In addition, Ipsen & Per Langaa (2010) showcased that optimizing knowledge workers’ performance goes hand in hand with the prevention of occupational stress and that the primary drivers of occupational stress are derived from organizational design.

Whenever occupational stress was deemed as chronic it began to have significant implications on knowledge workers overall motivation levels and occupational wellbeing. When knowledge workers felt that they lacked adequate mental or physical resources to cope with stress, it had negative effects on their perception of control. As knowledge workers lost the perception of being in control of the everyday working environments and the job itself, further decreases in job performance and motivation occurred. Working environments in which knowledge workers felt that they are not in control of not only further inflicted additional stress but also had detrimental effects on creativity. Perception of control seemed to affect knowledge workers' motivation in and on itself, however the primary factors that had the biggest effect on the motivation of knowledge workers was the organization itself and more specifically organizational structure. Environment and organizational design played a role on how knowledge workers were able to orient themselves within an organization which was linked to the perception of control. The findings from this thematic analysis suggests that occupational stress influences multiple different variables which in turns affects knowledge workers' job performance in an adverse way.

### **Decreased occupational wellbeing**

The constituent sub-themes out of which the main theme decreased occupational wellbeing was derived from were decreased job satisfaction, decreased wellbeing and increased risk of absenteeism and resignation. As beforementioned decreased occupational wellbeing is not necessarily a direct factor that would have effects on knowledge workers' job performance however occupational wellbeing was frequently associated with job performance either directly or indirectly. Decreased occupational wellbeing was separated to its own individual main theme as opposed to a sub theme of decreased occupational performance for two reasons. First reason being that occupational wellbeing was frequently addressed to be affected negatively by occupational stress and secondly because decreased occupational wellbeing was shown to have adverse implications on knowledge workers' job performance on its own.

According to Goswami (2015) overall wellbeing and happiness at work correlated with higher motivation which further emphasized the notion that being motivated at work is a prerequisite for optimal performance. In addition to decreasing all around job performance of knowledge workers, occupational stress also had effects on wellbeing and job satisfaction. (51-56.) Decreased wellbeing and job satisfaction seems to pose an increased risk of job absenteeism and at more extreme, resignation from duties. Employees who were prone to occupational stress were more likely to withdraw themselves away from the stressors if the stressors were deemed as long lasting by the employees. Knowledge workers in the banking sectors withdrew themselves from the chronic stressors by increasing the amount of sick days or even resigning from duties (ibid., 51-56).

Job satisfaction as experienced by knowledge workers played a great role when it comes to occupational stress. Chronic occupational stress had negative effects on knowledge workers' job satisfaction. Study by Najafi (2011) regarding the relationship between stress management and knowledge workers' productivity showcased that job satisfaction has the greatest effect on knowledge workers' productivity (1412-1417). Study by Ipsen & Per Langaa (2010) regarding causes of occupational stress and individual strategies in knowledge work pointed out that work-related stress is a critical problem in knowledge work, and it affects job satisfaction adversely. Both aforementioned studies primarily focused on knowledge workers and noted that occupational stress affects job satisfaction negatively.

This thematic analysis showed that occupational stress affects knowledge workers' performance on three main categorical levels. First one being that occupational stress has major implications on knowledge workers' job performance by interfering with productivity, efficiency and the ability to perform at an optimal level (Najafi 2011, 1412-1417). Second major implication that occupational stress had on knowledge workers' job performance is that it decreases overall wellbeing during working hours and thus also decreases knowledge workers' job satisfaction. Decreased wellbeing was connected to decreased satisfaction which in turn were associated with further decreases in knowledge workers' performance. (Goswami & Tulsee 2015, 51-56.)

Third major implication was that when occupational stress was chronic, knowledge workers felt that they are not in control of their work or working conditions. This feeling of powerlessness felt by knowledge workers elevated the risk of absenteeism. As occupational stress got too severe to be combatted accordingly, knowledge workers attempted to avoid the source of stress altogether and the best way they saw fit was by removing themselves from the working environment in the way of absenteeism. Whenever occupational stress grew to heights in which knowledge workers don't feel in control of the risk of resignation grows. (Goswami & Tulsee 2015, 51-56.)

In light of the results from this thematic analysis, it is possible to argue that occupational stress is a frequent and dynamic occurrence within knowledge-based organizations, and it does indeed come with unwanted consequences on knowledge workers' job performance. Every study that was taken in to account in this systematic review showcased a clear relationship between occupational stress and decreased job performance.

## 4.2 Organizational, Managerial & Individual issues

2 <sup>nd</sup> Research question: How can occupational stress be mitigated?	
Themes	Sub-themes
<b>Organizational culture</b>	>Organizational design >Fulfilling and collaborative relationships with management and peers >Sufficient organizational resources
<b>Individual Responsibility</b>	>Stress management skills >Self-management skills
<b>Managerial and organizational interventions</b>	> Counselling and career planning, training and workshops >Decreasing unnecessary complexity

Based on the findings from this thematic analysis occupational stress appears to be a phenomenon in which there are no single definitive solutions that would work for everyone; however, the findings do showcase possible methods that could help in the mitigation of occupational stress. Three main themes arose from the literature after conducting a thematic analysis. Singlehandedly across every study regarding occupational stress, one clearly identifiable factor that was also categorized in to a separate main theme was organizational culture. Second main theme that was made apparent whilst performing the thematic analysis was the importance of individual responsibility. Last and third theme was managerial and organizational interventions.

### **Organizational culture**

The main theme organizational culture was created from three sub-themes which were organizational design, collaborative relationships with management and peers and lastly sufficient organizational resources. Organizational design referred to the interplay between employees, managers, resources and organizational goals. Study conducted by Altindag (2020) regarding stress management and job performance in organizations reported that working conditions, environment, organizational climate and good relationships among employees determines the level of collective occupational stress (43-49). Great organizational design constituted from many different variables and was a major determiner of the total amount of occupational stress experienced by the collective organization.

Good and collaborative relationships with peer-employees and managers seemed to be one of the major constituent parts of good organizational design. As was the presence of sufficient organizational resources. These two were assigned to their own sub-themes due to frequent presence in the literature. Great relationships with peers and managers in addition to presence of sufficient organizational resources were seen more as factors that contributes to good organizational design. This view is also supported by Altindag (2020) who reported that anything that intervenes with the proper functioning of the factors that contributes to a good organizational design may decrease employee performance (Ibid., 43-49).

Organizational design appears to be a factor that is made out of many distinct variables which in turn makes organizational design a precursor to organizational culture. This finding is highly supported by one of the studies in the thematic analysis by Ipsen & Per Langaa that highly emphasizes the importance of great organizational culture. Stating that the root causes of occupational stress are linked back to organizational design and that by a collective focus on the improvement of organizational culture would drastically help in the mitigation of occupational stress. [Causes of work-related stress and individual strategies in knowledge work] 2010.) Common consensus was possible to be identified which was that organizational culture seems to be the primary nominator of collective and individual occupational stress. In light of these results, defining all the key characteristics, traits and variables that goes in to the creation and maintenance of a good organizational culture is difficult, and the author believes it's better not to try and speculate.

### **Individual responsibility**

Improving organizational culture appeared to be the most influential factor when it comes to the mitigation of occupational stress, however throughout the conduction of the thematic analysis, individual responsibility and its importance was a frequent occurrence in the data. Individual responsibility as a main theme refers to all those actions that a knowledge worker embarks upon that with high likelihoods will help in the mitigation of occupational stress. Individual responsibility as a main theme was derived from its two sub themes which were stress management skills and self-management skills. Stress management skills referred to actions, skills and coping strategies performed by knowledge workers often during working hours such as ensuring distraction free working environments and taking sufficient number of breaks. Self-management skills sub-theme referred to a broader category of skills that includes both off work and during work activities, such as self-educating and mindset work.

These views are emphasized and supported by an included study by Najafi (2011) on knowledge workers' productivity and stress management that mentioned that the ability and skill to oversee one's own situation and take personal responsibility on one's own health in terms of healthy lifestyle choices may help in the mitigation of occupational stress (1412-1417).

Based on the findings from the thematic analysis, individual responsibility appeared to be useful in the combatting of occupational stress only to a limited point. Organizational culture and necessary interventions from managers and organizations appeared to be the bedrock and individual actions seemed to help after solid foundations existed. Meaning that the highest responsibility lies in the hands of organizations and managers.

### **Managerial and organizational interventions**

Managerial responsibility and interventions from the organization itself appears to have significant implications when it comes to the mitigation of occupational stress. Interventions such as providing counselling and career planning when need be were seen as beneficial in reducing occupational stress and specifically role ambiguity which according to the literature is a big cause of occupational stress. The prevalence of highlighting the importance of organizational interventions was frequent in the literature. Study by Goswami (2015) on occupational stress and its effects on employees in the banking sector concluded based on research findings that in addition to great working conditions and necessary resources, career planning and organizational interventions may be beneficial for mitigating occupational stress. Goswami pointed out that counselling sessions and further training sessions, such as time management and behavioral training programs helps to equip knowledge workers with better skills and abilities on managing occupational stress. (51-56.) Managers carry the highest responsibility in ensuring that the communication within the organization is as efficient and as transparent as possible between the managers and employees. Disruptions in the communication between knowledge workers and managers may enhance occupational stress. (Amjad, Kazmi & Khan 2008, 136.)

According to Altindag (2020) factors such as role uncertainty, role conflict and regulatory barriers further add to the amount of occupational stress a knowledge worker is experiencing. Altindag further concludes that collective organizational stress and occupational stress often occur simultaneously which often hints that deficiencies in the management policies reflect on individual employees. Administrative and managerial personnel within knowledge-based organizations should identify whenever occupational stress has grown to great heights and take necessary measures at rectifying it in order to maintain adequate performance from knowledge workers (43-49.) Organizational and managerial interventions were also seen as a tool that aided in the creation of positive and safe working environments. In addition, as a way to communicate and interact with knowledge workers in a way that decreases role ambiguity and unnecessary job complexity. Unnecessary job complexity was seen as unpredictable working hours and working conditions.

Based on these findings, the most important aspect when it comes to the mitigation of occupational stress in a knowledge-based organization is organizational culture. After organizational culture, individual responsibility seemed to play significant role, in terms of practicing healthy lifestyle choices during leisure time and at work. Third factor that seemed to be extremely important in the mitigation of occupational stress based on these findings is the responsibility that managers and the organization itself has. Providing the necessary resources and possibilities, such as regular counselling sessions, trainings and workshops.

## 5 Discussion

This research was undertaken to gain a better understanding about the effects of occupational stress and its effects on knowledge workers' job performance and to identify what possibilities exist that would assist in the mitigation of occupational stress. Occupational stress is a fairly well studied phenomena and its negative downsides are understood, however research that would exclusively take in to account occupational stress and its effects on knowledge workers is lacking.

The objectives of this study were to

- To obtain deeper understanding of occupational stress.
- To identify the dominant streams of scholarly literature related to occupational stress and its effects on knowledge workers' job performance.
- To find potential ways to mitigate occupational stress.

To meet these objectives answers to the research questions are provided.

### 5.1 Answers to the Research Questions

**A.** What effects does occupational stress have on knowledge workers' job performance?

The results of this study show that occupational stress has negative implications on knowledge workers' performance in two ways. First one being is that occupational stress seems to have a dose dependent effect on knowledge workers' job performance, meaning that higher levels of occupational stress correlates with further decreases in job performance. Occupational stress seems to decrease knowledge workers' job performance by interfering with knowledge workers ability to utilize given resources as efficiently as possible and by interfering with their ability to act in a productive manner. The second major finding was that occupational stress appears to decrease occupational wellbeing of knowledge workers. Occupational wellbeing does not directly decrease knowledge workers' job performance, however decreased

occupational wellbeing was indirectly linked to decreased job performance in ways such as decreased job satisfaction and overall wellbeing.

Aforementioned factors were seen as detrimental factors to job performance either directly (decreased performance) or indirectly (increased likelihood of absenteeism or even resignation).

#### **B. How can occupational stress be mitigated?**

The results of the present study richly describe that three possible ways can assist in the mitigation of occupational stress. The most significant factor that seems to play the biggest role in the generation of occupational stress is the organizational culture of a given company. Proper organizational design accompanied with rich, fulfilling and collaborative relationships among peers and management and sufficient organizational resources seems to be notable drivers behind a great organizational culture. Organizational culture seems to be the primary factor that has the biggest implications on occupational stress. The findings suggest that a bad organizational culture may on its own significantly increase occupational stress. On the contrary, a good organizational culture plays a significant role on mitigating occupational stress. Second major finding was that individual responsibility is important when it comes to mitigating occupational stress. Being in possession of necessary skills and abilities to combat and cope with stress seems to be highly helpful in the mitigation of occupational stress. The third notable finding was that managerial and organizational interventions are very important when it comes to combatting occupational stress. Interventions such as offering counselling and career planning. Providing relevant training and workshops seems to assist in the mitigation of occupational stress. In addition, attempts at decreasing unnecessary complexity such as irregular working hours seems to assist.

## **5.2 Practical / Managerial Implications**

These results build on the existing understanding that occupational stress has adverse implications on employees. Based on the findings from this research several courses of actions can be taken by managers in knowledge-based organizations. Most significant factor that appears to contribute most to the collective occupational stress of a knowledge organization is organizational culture. Therefore managers in a knowledge organization should first focus on identifying whether or not knowledge workers are battling with occupational stress within a given company. If after inspection it is identified that occupational stress is a recurring phenomenon within a given organization then the first course of action that should be acted upon is to pay great attention on to the organizational culture. Identifying and assessing the organizational environment and culture to see if there are things present that could be dealt with accordingly. Another important practical implication is that the possibility of managerial and/organizational interventions to knowledge workers in terms of counselling, training or similar activities may be beneficiary when it comes to combatting occupational stress. The findings of the present study should encourage managers to take appropriate measures in improving organizational culture and ensuring that knowledge workers are in the possession of adequate resources in terms of assistance, so that they are able to deal with occupational stress and thus perform at an optimal level.

## **5.3 Assessment of the results in the light of the knowledge base**

The findings from this study suggests that occupational stress is a notable problem within knowledge-based organizations and that occupational stress is detrimental to knowledge workers' job performance and it has implications on the overall quality of life of knowledge workers in ways such as decreased wellbeing. These finding are in line with prior studies that take in to account occupational stress and the performance of employees in any given field. One factor that stands out from this study when compared to other similar studies is the importance of organization culture and how the culture of a given organization is a major nominator that either

increases occupational stress when it's considered bad or decreases occupational stress when it is considered good.

#### **5.4 Limitations of the research**

Primary limitation within this research is the fact that the demographics within the individual studies were not similar, meaning that the participants under study (knowledge workers) were of multiple different occupations such as employees in the banking sector and managers. Although be it that all the participants under study were indeed knowledge workers, the differences in the nature of their occupation might not give as accurate of an understanding. Another limitation that may possibly have had implications on the reliability of this research is that multiple case studies were included in the systematic review. Research questions were answered in a manner that that would fill the criteria of corresponding with proper internal validity. When considering the external validity, the author believes that the findings from this study do apply in other instances in which occupational stress and knowledge workers' job performance is investigated, however should a similar study be conducted that takes in to account other demographics then the external validity can only be speculated and no definitive answers can be established. Author believes that the conduction of this study and the results that were derived were done in an objective manner, although be it the elimination of bias can't be confirmed with absolute certainty due to the rather subjective nature of a thematic analysis.

#### **5.5 Recommendations for the future research**

The author believes that new research is needed to be able to get a complete view and understanding as to what could be done in order to decrease occupational stress within knowledge-based organizations. Knowledge work is only going to keep increasing and it could be assumed that knowledge work is going to be seen as the new norm in the upcoming years. As the unwanted consequences of occupational stress on knowledge workers' job performance is understood better, future research should really focus on the organizational factors. Identifying and investigating all those variables within a company culture that makes it an environment in which

knowledge workers are capable of performing at their best. In addition, future research could also investigate and try to bring further understanding on what those actions are that knowledge workers themselves could do in attempts to assist in the mitigation of occupational stress.

## References

5 things you should know about stress. N.d. Page on the National Institute of Mental Health. Accessed on 8 April 2020. Retrieved from

<https://www.nimh.nih.gov/health/publications/stress/index.shtml>

Altindaag, O. 2020. Relationship between stress management and job performance in organizations. *International Journal of Research in Business and Social Science*. 9. 43-49. Accessed on 18 April 2020. Retrieved from [https://www.researchgate.net/publication/340169497 Relationship between stress management and job performance in organizations](https://www.researchgate.net/publication/340169497_Relationship_between_stress_management_and_job_performance_in_organizations)

Benson, J., & Brown, M. 2007. Knowledge workers: What keeps them committed; What turns them away. *Work employment & Society*. 21, 121-141. Accessed on 9 April 2020. Retrieved from [https://www.researchgate.net/publication/249828474 Knowledge Workers What Keeps Them Committed What Turns Them Away](https://www.researchgate.net/publication/249828474_Knowledge_Workers_What_Keeps_Them_Committed_What_Turns_Them_Away)

Bhui, K., Dinos, S., Galant- Miecznikowska, M., Jongh, B., & Stansfeld, S. 2016. Perceptions of work stress causes and effective interventions in employees working in public, private and non-governmental organizations: a qualitative study. *BJPsych bulletin*, 40(6), 318-325. Accessed on 12 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5353523/>

Bosnjak, M., Dobovski-Poslon, M., Bibib, Z., & Bosnjak, K. 2019. The influence of chronic stress on health and coping mechanisms. *Sanamed*. 14. 97. Accessed on 10 April 2020. Retrieved from [https://www.researchgate.net/publication/332055123 THE INFLUENCE OF CHRONIC STRESS ON HEALTH AND COPING MECHANISMS](https://www.researchgate.net/publication/332055123_THE_INFLUENCE_OF_CHRONIC_STRESS_ON_HEALTH_AND_COPING_MECHANISMS)

Braun V., & Clarke, V. 2006. Using thematic analysis in psychology. *Qualitative Research in Psychology*. 3. 77-101. Accessed on 12 April 2020. Retrieved from

[https://www.researchgate.net/publication/235356393\\_Using\\_thematic\\_analysis\\_in\\_psychology](https://www.researchgate.net/publication/235356393_Using_thematic_analysis_in_psychology)

Brinkley, I., Fauth, R., Mahdon, M., & Theodoropoulou, S. 2009. Is knowledge work better for us? Knowledge workers, good work and well-being. Accessed on 2 April 2020. Retrieved from [https://www.researchgate.net/publication/274324989\\_Is\\_Knowledge\\_Work\\_Better\\_for\\_Us\\_Knowledge\\_Workers\\_Good\\_Work\\_and\\_Well-Being](https://www.researchgate.net/publication/274324989_Is_Knowledge_Work_Better_for_Us_Knowledge_Workers_Good_Work_and_Well-Being)

Campbell, J., & Wiernik, B. 2015. The modeling and assessment of work performance. Annual reviews, Organizational psychology. 2, 47-74. Accessed on 13 April 2020. Retrieved from [https://goal-lab.psych.umn.edu/orgpsych/readings/8.%20Productive%20Behavior/Campbell%20&%20Wiernik%20\(2015\).pdf](https://goal-lab.psych.umn.edu/orgpsych/readings/8.%20Productive%20Behavior/Campbell%20&%20Wiernik%20(2015).pdf)

Christine, I., & Per Langaa, J. 2010. Causes of work-related stress and individual strategies in knowledge work. DTU Management. 10. Accessed on 18 April 2020. Retrieved from <https://backend.orbit.dtu.dk/ws/files/4370742/Causes%20of%20work-related%20stress%20in%20knowledge%20work.pdf>

Diaz-Vilela, L., Rodriquez, N., Isla-diaz, R., Diaz-Cabrera D., Hernandez-Fernaund, E. Rosales-Sanchez, C. 2015. Relationship between contextual and task performance and interrater agreement: Are there any? Plus one, 10(10). Accessed on 13 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4608809/>

Drucker, P. 1999. Knowledge-worker productivity: The biggest challenge. California review management. 41. 2. Accessed on 4 April 2020. Retrieved from [http://www.forschungsnetzwerk.at/downloadpub/knowledge\\_workers\\_the\\_biggest\\_challenge.pdf](http://www.forschungsnetzwerk.at/downloadpub/knowledge_workers_the_biggest_challenge.pdf)

Dul, J., Ceylan, C., & Jaspers, F. 2011. Knowledge worker creativity and the role of the physical work environment. Master's thesis, Rotterdam school of management. Accessed on 6 April 2020. Retrieved from <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=29&ved=2ah>

[UKewiWrp2U74rpAhXkk4sKHSg3D2c4FBAWMAh6BAgJEAE&url=https%3A%2F%2Fpub.eur.nl%2Fpub%2F22530%2FDulCeylanJaspers2011.pdf&usg=AOv-Vaw3mfUiDPNNERAnPlqzyHzu](https://www.researchgate.net/publication/334559841_IMPACT_OF_JOB_STRESS_ON_EMPLOYEES_PRODUCTIVITY_AND_COMMITMENT)

Ekineabor, E. 2019. Impact of job stress on employee's productivity and commitment. 2. 124-133. Accessed on 14 April 2020. Retrieved from [https://www.researchgate.net/publication/334559841\\_IMPACT\\_OF\\_JOB\\_STRESS\\_ON\\_EMPLOYEES\\_PRODUCTIVITY\\_AND\\_COMMITMENT](https://www.researchgate.net/publication/334559841_IMPACT_OF_JOB_STRESS_ON_EMPLOYEES_PRODUCTIVITY_AND_COMMITMENT)

Elkatawneh, H., 2016. Comparing Qualitative and Quantitative approaches. SSRN Electronic Journal. Accessed on 15 April 2020. Retrieved from [https://www.researchgate.net/publication/315029674\\_Comparing\\_Qualitative\\_and\\_Quantitative\\_Approaches](https://www.researchgate.net/publication/315029674_Comparing_Qualitative_and_Quantitative_Approaches)

Fonkeng, C. 2018. Effects of job stress on employee performance in an enterprise. Bachelor's thesis. Centria university of applied sciences. Degree programme in business management. Accessed on 12 April 2020. Retrieved from <https://www.the-seus.fi/bitstream/handle/10024/145790/Celine%20Fonkeng%20pdf.pdf?sequence=1&isAllowed=y>

Georgise, F., Thoben, K., & Seifert, M. Assessing the existing performance measures & measurement systems in developing countries: An Ethiopian study. Global Journal of Researches in Engineering - Industrial Engineering.13. 1 -14. Accessed on 13 April 2020. Retrieved from [https://www.researchgate.net/publication/259389516\\_Assessing\\_the\\_Existing\\_Performance\\_Measures\\_Measurement\\_Systems\\_in\\_Developing\\_Countries\\_An\\_Ethiopian\\_Study](https://www.researchgate.net/publication/259389516_Assessing_the_Existing_Performance_Measures_Measurement_Systems_in_Developing_Countries_An_Ethiopian_Study)

Governance of Educational trajectories in Europe. N.d. Page on the GOETE glossary wiki. Accessed on 4 April 2020. Retrieved from <http://www.goete.eu/glossary>

Goswami, T, G. 2015. Job stress and its effect on employee performance in banking sector. 6. 51-56. Accessed on 18 April 2020. Retrieved from <https://search-proquest->

[com.ezproxy.jamk.fi:2443/abicom-plete/docview/1687987519/86DD819E64994B0BPQ/54?accountid=11773](https://com.ezproxy.jamk.fi:2443/abicom-plete/docview/1687987519/86DD819E64994B0BPQ/54?accountid=11773)

Gilboa, S., Shirom, A., & Fried, Y. 2005. A meta-analysis of stress and performance at work: Moderating effects of gender, age and tenure. *Academy of management*. Accessed on 12 April 2020. Retrieved from <https://journals.aom.org/doi/pdf/10.5465/ambpp.2005.18780289>

Governance of Educational trajectories in Europe. N.d. Page on the GOETE glossary wiki. Accessed on 4 April 2020. Retrieved from <http://www.goete.eu/glossary>

Ham-Baloyi, W. & Jordan, P. 2016. Systematic review as a research method in postgraduate nursing education. *Health SA Gesondheid*. 21. 120-128. Accessed on 1 April 2020. Retrieved from [https://www.researchgate.net/publication/324642345\\_Systematic\\_review\\_as\\_a\\_research\\_method\\_in\\_postgraduate\\_nursing\\_education](https://www.researchgate.net/publication/324642345_Systematic_review_as_a_research_method_in_postgraduate_nursing_education)

Hammen, C., Kim, E., Eberhart, N., & Brennan, P. 2012. Chronic and acute stress and the prediction of major depression in women. *Depression and anxiety*, 26(8), 718-723. Accessed on 12 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3380803/>

Hanaysha, J. 2016. Improving employee productivity through work engagement: evidence from higher education sector. *International journal of industrial engineering computations*. 6, 61-70. Accessed on 11 April 2020. Retrieved from [https://www.researchgate.net/publication/289298896\\_Improving\\_employee\\_productivity\\_through\\_work\\_engagement\\_Evidence\\_from\\_higher\\_education\\_sector](https://www.researchgate.net/publication/289298896_Improving_employee_productivity_through_work_engagement_Evidence_from_higher_education_sector)

Henry, B. 2012. Knowledge workers. 13. Accessed on 3 April 2020. Retrieved from [https://www.researchgate.net/publication/281625643\\_Knowledge\\_Workers](https://www.researchgate.net/publication/281625643_Knowledge_Workers)

Houghton, J., & Sheehan, P. 2000. A primer on the knowledge economy. *Centre for strategic economic studies*. 18. Accessed on 5 April 2020. Retrieved from <https://core.ac.uk/download/pdf/10826008.pdf>

- Hernaus, T., & Mikulic, Josip. 2014. Work characteristics and work performance of knowledge workers. *EuroMed Journal of Business*. 9. Accessed on 3 April 2020. Retrieved from [https://www.researchgate.net/publication/265732876\\_Work\\_characteristics\\_and\\_work\\_performance\\_of\\_knowledge\\_workers](https://www.researchgate.net/publication/265732876_Work_characteristics_and_work_performance_of_knowledge_workers)
- Kazmi, R., Amjad, S., & Khan, D. 2008. Occupational stress and its effect on job performance a case study of medical house officers of district Abbottabad. 20. 3. Accessed on 18 April 2020. Retrieved from [http://applications.emro.who.int/imemrf/J\\_Ayub\\_Med\\_Coll/J\\_Ayub\\_Med\\_Coll\\_2008\\_20\\_3\\_135\\_139.pdf](http://applications.emro.who.int/imemrf/J_Ayub_Med_Coll/J_Ayub_Med_Coll_2008_20_3_135_139.pdf)
- Khan, K., Kunz, R., Kleijnen, J. & Antes, G. 2003. Five steps to conducting a systematic review. *Journal of the Royal society of medicine*, 96(3), 118-121. Accessed on 10 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC539417/>
- Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). 2019. *Cochrane Handbook for Systematic Reviews of Interventions* version 6.0. Accessed on 13 April 2020. Retrieved from <https://training.cochrane.org/handbook>
- Lazzoline, G., & Laise, D. 2018. Knowledge worker productivity: is it really impossible to measure it? *Measuring business excellence*. Accessed on 11 April 2020. Retrieved from [https://www.researchgate.net/publication/328379110\\_Knowledge\\_worker\\_productivity\\_is\\_it\\_really\\_impossible\\_to\\_measure\\_it](https://www.researchgate.net/publication/328379110_Knowledge_worker_productivity_is_it_really_impossible_to_measure_it)
- Maartje, P. 2018. Effects of work stress, organization culture and job satisfaction toward employee performance in bank Maluku. 17. 1-12. Accessed on 18 April 2020. Retrieved from <https://search-proquest-com.ezproxy.jamk.fi:2443/abicomplete/docview/2137986933/5146A7925EDA4488PQ/106?accountid=11773>
- Maguire, M., & Delahunt, B. 2017. Doing a thematic analysis: A practical, step-by-step guide for learning and teaching scholars. *All Ireland journal of higher education*.

9. 3. Accessed on 13 April 2020. Retrieved from <https://ojs.aishe.org/index.php/aishe-j/article/view/335>

Matthews, G., Wohleber, R., & Lin, J. 2019. Stress, skilled performance and expertise: Overload and beyond. Accessed on 13 April 2020. Retrieved from [https://www.researchgate.net/publication/333934636 Stress Skilled Performance and Expertise Overload and Beyond](https://www.researchgate.net/publication/333934636_Stress_Skilled_Performance_and_Expertise_Overload_and_Beyond)

McEwen. B., 2017. Neurobiological and systemic effects of chronic stress. Thousand Oaks, Calif. 1. Accessed on 10 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5573220/>

Mladkova, L. 2012. Leadership in management of knowledge workers. Procedia- social and behavioral sciences. 41, 243-250. Accessed on 5 April 2020. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1877042812009081>

Moher, D., Liberati, A., Tetzlaff, J., & Altman, Dg. 2009. Preferred reporting items for systematic reviews and meta-analyses: The Prisma statement. 6. 7. Accessed on 15 April 2020. Retrieved from <http://prisma-statement.org/PRISMAStatement/FlowDiagram>

Morse, J., Barret, M., Mayan, M., Olson, K., & Spiers, J. 2002. Verification strategies for establishing reliability and validity in qualitative research. International journal of qualitative methods, 13-22. Accessed on 13 April 2020. Retrieved from <https://journals.sagepub.com/doi/full/10.1177/160940690200100202#articleCitationDownloadContainer>

Motowidlo, S., & Kell, H. 2012. Job performance. Handbook of psychology. Accessed on 12 April 2020. Retrieved from [https://www.researchgate.net/publication/236624589 Job Performance](https://www.researchgate.net/publication/236624589_Job_Performance)

Mladkova, L. 2012. Leadership in management of knowledge workers. *Procedia- social and behavioral sciences*. 41, 243-250. Accessed on 5 April 2020. Retrieved from <https://www.sciencedirect.com/science/article/pii/S1877042812009081>

Mosadeghrad, A. 2014. Occupational stress and its consequences. *Leadership in Health Services*. 27. 224-239. Accessed on 12 April 2020. Retrieved from [https://www.researchgate.net/publication/275316591\\_Occupational\\_stress\\_and\\_its\\_consequences](https://www.researchgate.net/publication/275316591_Occupational_stress_and_its_consequences)

Mustafa, M., Illzam, Em., Muniandy, RK., Hasmi, MI., Sharifa, AM., & Nang, MK. 2015. Causes and prevention of occupational stress. 14. 98-104. Accessed on 5 April 2020. Retrieved from [https://www.researchgate.net/publication/321019697\\_Causes\\_and\\_Prevention\\_of\\_Occupational\\_Stress](https://www.researchgate.net/publication/321019697_Causes_and_Prevention_of_Occupational_Stress)

Najafi, A. 2011. Knowledge workers productivity and stress management and in the irancell company. *Australian journal of basic and applied sciences*. 5. 1412-1417. Accessed on 18 April 2020. Retrieved from <https://pdfs.semanticscholar.org/0ff7/b652d7f2d403bf467910c84857cd1e7907e8.pdf>

Narban, J., Narban B., & Singh, J. 2016. A conceptual study on occupational stress (Job stress/work stress) and its impacts. *NIMS institute of management & computer science*. 2, 1. Accessed on 12 April 2020. Retrieved from [http://ijariie.com/AdminUploadPdf/A\\_Conceptual\\_Study\\_on\\_Occupational\\_Stress\\_Job\\_Stress\\_Work\\_Stress\\_and\\_its\\_Impacts\\_ijariie1544.pdf](http://ijariie.com/AdminUploadPdf/A_Conceptual_Study_on_Occupational_Stress_Job_Stress_Work_Stress_and_its_Impacts_ijariie1544.pdf)

Pagani, R., Pilatti, L., & Carvalho, H. 2009. Characteristics and necessary abilities to the knowledge worker. Accessed on 11 April 2020. Retrieved from [https://www.researchgate.net/publication/275638558\\_Characteristics\\_and\\_necessary\\_abilities\\_to\\_the\\_knowledge\\_worker](https://www.researchgate.net/publication/275638558_Characteristics_and_necessary_abilities_to_the_knowledge_worker)

Patino, C., & Ferreira, J. 2018. Inclusion and exclusion criteria in research studies: definitions and why they matter. *Brazilian journal of pulmonology*. 44(2), 84. Accessed

on 12 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6044655/>

Patino, C., & Ferreira, J. 2018. Internal and external validity, can you apply research study results to your patients? *Brazilian journal of pulmonology*. 44(3), 183. Accessed on 15 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6188693/>

Palvalin, M. 2019. What matters for knowledge work productivity? *Employee relations*, 41(1). Accessed on 3 April 2020. Retrieved from [https://tutcris.tut.fi/portal/files/17693960/What Matters for Knowledge Work Productivity.pdf](https://tutcris.tut.fi/portal/files/17693960/What_Matters_for_Knowledge_Work_Productivity.pdf)

Quick, J., & Henderson, D. 2016. Occupational stress: Preventing suffering, enhancing wellbeing. *International journal of environmental research and public health*, 13(5), 459. Accessed on 14 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4881084/>

Quinlan, J., Tu, M., Langlois, E., Kapoor, M., Ziegler, D., Fahmi, H., & Zunzunegui, M. 2014. Protocol for a systematic review of the association between chronic stress during the life course and telomere length. *Systematic reviews*, 3, 40. Accessed on 14 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4022427/>

Rahman, S., & Akter, N. 2012. Impact of stress on task performance: An empirical study. 27. Accessed on 13 April 2020. Retrieved from [https://www.researchgate.net/publication/326330970 Impact of Stress on Task Performance An Empirical Study](https://www.researchgate.net/publication/326330970_Impact_of_Stress_on_Task_Performance_An_Empirical_Study)

Ramirez, Y., & Nembhard, D. 2004. Measuring knowledge-worker productivity: A taxonomy. *Journal of intellectual capital*. 5, 602-628. Accessed on 11 April 2020. Retrieved from [https://www.researchgate.net/publication/235268678 Measuring Knowledge Worker Productivity A Taxonomy](https://www.researchgate.net/publication/235268678_Measuring_Knowledge_Worker_Productivity_A_Taxonomy)

Ruostela, J. 2012. Improving knowledge work productivity through new ways of working. Master of science thesis. Tampere university of technology. Accessed on 14 April 2020. Retrieved from <https://trepo.tuni.fi/bitstream/handle/123456789/21260/ruostela.pdf?sequence=3&isAllowed=y>

Ratnawat, R., & Jha, P. 2014. Impact of job-related stress on employee performance: A review and research agenda. *Journal of business and management*. 16, 01-06. Accessed on 13 April 2020. Retrieved from <http://www.iosrjournals.org/iosr-jbm/papers/Vol16-issue11/Version-5/A0161150106.pdf>

Sapolsky, R. 2004. Social status and health in humans and other animals. *Annual reviews*. Accessed on 13 April 2020. Retrieved from <https://www.annualreviews.org/doi/pdf/10.1146/annurev.anthro.33.070203.144000>

Sauerman, J. 2016. Performance measures and worker productivity. *World of labor*. 260. Accessed on 11 April 2020. Retrieved from <https://wol.iza.org/uploads/articles/260/pdfs/performance-measures-and-worker-productivity.pdf>

Sandi, C., 2013. Stress and cognition. *Wiley interdisciplinary reviews: cognitive science*. Accessed on 10 April 2020. Retrieved from [https://www.researchgate.net/publication/264297142 Stress and Cognition](https://www.researchgate.net/publication/264297142_Stress_and_Cognition)

Schardt, C., Adams, M., Owens, T., Keitz, S., & Fontelo, P. 2007. Utilization of the PICO framework to improve searching PubMed for clinical questions. *BMC Med Inform decision making*. 7.16. Accessed on 18 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1904193/>

Shahsavarani, A., Abadi, E., & Kalkhoran, M. 2015. Stress: Facts and theories through literature review. *International journal of medical reviews*. 2. 230-241. Accessed on 4 April 2020. Retrieved from [http://www.ijmedrev.com/article\\_68654\\_37adc02e9432adfa017b8d6095cb6760.pdf](http://www.ijmedrev.com/article_68654_37adc02e9432adfa017b8d6095cb6760.pdf)

Shiel, W. 2018. Definition of stress. Rxlist. Accessed on 6 April 2020. Retrieved from <https://www.rxlist.com/script/main/art.asp?articlekey=20104>

Siddaway, A., Wood, A. & Hedges L. 2019. How to do a systematic review: A best practice guide for conducting and reporting narrative reviews, meta-analyses and meta-syntheses. Annual Review of Psychology. 70. Accessed on 10 April 2020. Retrieved from <https://www.researchgate.net/publication/326910386> [How to Do a Systematic Review A Best Practice Guide for Conducting and Reporting Narrative Reviews Meta-Analyses and Meta-Syntheses](https://www.researchgate.net/publication/326910386)

Smith, J., & Noble, H. 2015. Issues of validity and reliability in qualitative research. Evidence-based nursing. 18. 34-35. Accessed on 15 April 2020. Retrieved from <https://ebn.bmj.com/content/18/2/34>

Staal, M., 2004. Stress, cognition and human performance: A literature review and conceptual framework. Ames research center. Accessed on 13 April 2020. Retrieved from [https://humansystems.arc.nasa.gov/publications/20051028105746\\_IH-054%20Staal.pdf](https://humansystems.arc.nasa.gov/publications/20051028105746_IH-054%20Staal.pdf)

Turriago-Hoyos, A., Thoene, U., & Arjoon, S. 2016. Knowledge Workers and Virtues in Peter Drucker's Management Theory. SAGE Open. Accessed on 4 April 2020. Retrieved from <https://journals.sagepub.com/doi/full/10.1177/2158244016639631#articleCitationDownloadContainer>

Uman, L. 2011. Systematic reviews and meta-analyses. Journal of the Canadian academy on child and adolescent psychiatry. 20(1), 57-59. Accessed on 13 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3024725/>

Yaribeygi, H., Panahi, Y., Sahraei, H., Johnston, T., & Sahebkar, A. 2017. The impact of stress on body function: A review. EXCLI journal, 16, 1057-1072. Accessed on 10 April 2020. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5579396/>

Zhan, H., Tang, T., & Zhang, Y. 2013. The research on characteristics of knowledge workers and their motivating factors: A review and comparison study. *American journal of industrial and business management*, 3, 557-564. Accessed on 5 April 2020. Retrieved from [https://www.scirp.org/pdf/ajibm\\_2013102113173898.pdf](https://www.scirp.org/pdf/ajibm_2013102113173898.pdf)

Zhu, J., Shibalayeva S. 2017. How can you measure the productivity of knowledge workers? Student works. Accessed on 12 April 2020. Retrieved from <https://digital-commons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1156&context=student>

## Appendices

### Outlines of eligible studies

Author(s) and year of publication	Name of publication	Study purpose	Study design	Main findings
Marrtje (2018)	Effects of work stress, organization culture and job satisfaction toward employee performance in bank Maluku	To analyze the effect of occupational stress, organizational culture and job satisfaction on employee's performance	Explanatory study, which attempts to explain relationships between exogenous and endogenous variables. Questionnaire was used with a sample size of (n=196)	Occupational stress and organizational culture has significant implications on employees performance.
Goswami (2015)	Job stress and its effect on employee performance in banking sector	To evaluate empirically the outcomes of occupational stress on bank employee's performance	Structured questionnaire was used, and Z-test was used to analyze the data. Sample size was branches from 20 different banks, including 100 executives.	Occupational stress has detrimental effects on employee's overall health, wellbeing alongside with productivity.
Altindag (2020)	Relationship between stress management and job performance in organizations	To examine the concept of stress and to assess whether a relationship exists between stress management and job performance.	Literature review consisting of twelve scientific articles.	Structure of workplace environment, climate and relationships within an organization are a significant determining factor of occupational stress

Kazmi, Amjad & Khan (2008)	Occupational stress and its effect on job performance	To study and investigate the effects of occupational stress on job performance	A case study of medical house officers. Questionnaire of sample size (n=55) Data was analyzed with statistical methods, such as spearman's correlation and multiple regression	Occupational stress decreases house officer's performance. Prevention of occupational stress demands organizational interventions.
Najafi (2011)	Knowledge workers productivity and stress management	To review the relationship between stress and the productivity of knowledge workers of Iran cell Company.	Interviews and the completion of multiple questionnaires. Sample size of (N=120)	Occupational stress has unwanted implications, such as emotional and physical diseases. Decreases knowledge workers and managers productivity.
Ipsen & Per Langa (2010)	Causes of work-related stress and individual strategies in knowledge work	To study and investigate the causes of occupational stress and to identify coping strategies	Multiple case study in five different knowledge-based companies, interviews were used.	Optimizing knowledge workers performance requires stress prevention. Knowledge work requires good organizational environments.

## Thematic analysis coding

<b>Codes</b>
Improving organizational culture
Job satisfaction is correlated decreased occupational stress
Lack of proper work conditions increases occupational stress
Good working relationships increases job satisfaction and job performance
career planning decreases role ambiguity and occupational stress
counselling, training, education decreases occupational stress
proper management assists employee wellbeing, satisfaction and performance
mindset training helps in decreasing occupational stress
admins and managers have the highest responsibility
insufficient resources and poor communication
Long and unpredictable working hours, environment and complexity increases occupational stress
individual stress management assists in decreasing occupational stress
Organizational culture has effects on occupational stress
the application of organizational culture can improve employee performance.
More support given can make employees feel satisfied in working so as to maximize their performance.
Organization culture has positive effect toward employee's performance.
Interpersonal and intrapersonal conflicts are also the major reason of stress amongst employees.
Lack of resources, work overload and lack of communication increases occupational stress
Rootcauses of the problems are linked to the organizational design,
Organizational design is more important in assisting occupational stress than individuals actions
Correct stress management should start from improved health and good intrapersonal relationships.
solutions are found in the organizational design and not simply in relation to the individual.
Lack of resources, work overload and lack of communication contributes to increased occupational stress
An individual needs to maintain good level of personal health.
The prevention and management of workplace stress requires organizational level interventions,
A culture of openness and understanding decreases occupational stress
<b>Sub-Themes</b>
Organizational design
Fulfilling and collaborative relationships with management and peers
Sufficient organizational resources
Stress management skills
Self management skills
Counselling and career planning, training and workshops
Decreasing unnecessary complexity
<b>Main themes</b>
Organizational culture
Individual responsibility
Managerial and organizational interventions

<b>Codes</b>
Work stress has negative effects on job performance
Work stress negatively impacts working processes
Stressed employees withdraws from stressors which results in absenteeism and increased employee turnover
Job stress results in inefficient performance
Poor job performance results in decreased motivation
Optimizing knowledge work requires stress prevention
Occupational stress results in poorer performance
Work stress affects employee performance negatively
job satisfaction affects the performance of Maluku bank employees positively
Low satisfaction and motivation leads to poor performance, creativity and productivity
occupational/work stress affects the performance of employees in terms of efficiency and productivity
<b>Sub-Themes</b>
Decreased productivity and job efficiency
Decreased perception of control, job motivation and creativity
Decreased job satisfaction
Increased likelihood of absenteeism and resignation
<b>Main themes</b>
Decreased all around job performance
Decreased occupational wellbeing