

PREDICTING WORK-RELATED FLOW IN THE CHEMICAL INDUSTRY

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Mini-Dissertation submitted in fulfilment of the requirements
of the degree Magister Artium in Industrial Psychology
at the Potchefstroom Campus of the North-West University.

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Potchefstroom

2008

REMARKS

The reader is reminded of the following:

- The references and the editorial style as prescribed by the Publication Manual (5th edition) of the American Psychological Association (APA) were followed in this mini-dissertation. This practice is in line with the policy of the Programme in Industrial Psychology of the North-West University (Potchefstroom Campus) to use APA style in all scientific documents as from January 1999.
- *The mini-dissertation is submitted in the form of one research article.*

ACKNOWLEDGEMENTS

I wish to extend my gratitude to various individuals who, at various stages during the writing of this mini-dissertation, were prepared to help, guide and support me to complete this research successfully.

- I am deeply grateful to Greg Holmes, Managing Director of Bulk Mining Explosives, and Louis Fourie, Managing Director of Sasol Wax RSA, for allowing me to do research in these two companies.
- I owe a special debt of gratitude to Dr W. J. Coetzer, my mentor, for her persistent and competent guidance as well as her motivation, insight and faith in me throughout the writing of this dissertation. She has made this a meaningful learning experience.
- To Peter van der Merwe, my husband, for his constant support and motivation. I thank him for his faith in me.
- A special word of thanks to all colleagues and friends who completed the questionnaires.

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SUMMARY

Topic: Predicting work-related flow in the chemical industry.

Key terms: Leader empowering behaviour, self-efficacy, job characteristics, work-related flow, chemical industry.

In a new world of work characterised by competitiveness, benchmarking, technological innovation and efficiency, the South African chemical industry needs to function at an optimal level to meet the demands of its stakeholders and employees. The industry needs leadership of the highest standard and an efficient, productive workforce.

The objective of this study was to determine the relationship between leader empowering behaviour, self-efficacy, job resources and work-related flow for employees in the chemical industry. More specifically, it was examined whether personal and organisational resources facilitated flow at work, and whether employees who experienced flow mobilised more resources over time.

The research method consisted of a literature review and an empirical study. A cross-sectional survey design was used to collect the data. An availability sample ($N = 213$) from employees in the chemical industry was taken. A biographical questionnaire and a self-constructed instrument (JDRS) were used to measure the unique job demands and job resources in the chemical industry. Along with the JDRS, the Work-reLated Flow Scale (WOLF), the Leader Empowering Behaviour Questionnaire (LEBQ) and General Perceived Self-efficacy Questionnaire (GPSQ) were used as measuring instruments. The statistical analysis was conducted with the help of the SPSS program.

The results of the research indicate that the availability of leader empowering behaviour (i.e. delegation of authority, self-directed decision making, information sharing, and coaching for innovative performance), self-efficacy and job resources (i.e. supervision, availability of resources and autonomy) can result in higher levels of work-related flow in the workplace.

Recommendations were made for future research.

OPSOMMING

Onderwerp: Die voorspelling van werksverwante vloei in die chemiese nywerheid industrie.

Sleuteltermes: Leierbemagtigingsgedrag, selfdoeltreffendheid, werkseenskappe, werksverwante vloei, chemiese nywerheid.

In 'n nuwe werksomgewing wat deur mededinging, vergelyking, tegnologiese innovering en doeltreffendheid gekenmerk word, moet die Suid-Afrikaanse chemiese nywerheid teen 'n optimale vlak funksioneer om aan die vereistes van sy deelnemers en werknemers te voldoen. Die nywerheid benodig leierskap van die hoogste gehalte en 'n doeltreffende, produktiewe werksmag.

Die doelstelling van hierdie studie was om die verhouding tussen selfdoeltreffendheid, leiers se bemagtigingsgedrag, werkhulpbronne en werkverwante vloei in die chemiese nywerheid te bepaal. Meer spesifiek is daar ondersoek of persoonlike en organisatoriese hulpbronne werksverwante vloei fasiliteer, en of werknemers wat werksverwante vloei beleef mettertyd meer hulpbronne mobiliseer.

Die navorsingsmetode het uit 'n kort literatuuroorsig en 'n empiriese studie bestaan. 'n Dwarssnit-ontwerp is gebruik om data in te samel. 'n Beskikbaarheidsteekproef ($N = 213$) is uit lede van die chemiese nywerheid geneem. 'n Biografiese vraelys en 'n selfsaamgestelde vraelys (JDRS) is gebruik om die unieke werkseise en werkhulpbronne in die chemiese bedryf te meet. Benewens die JDRS is die Work-related Flow Scale (WOLF), die Leader Empowering Behaviour Questionnaire (LEBQ) en General Perceived Self-efficacy Questionnaire (GPSQ) as metingsinstrumente gebruik. Die statistiese ontleding is met behulp van die SPSS-program uitgevoer. Die statistiese metodes wat in die artikel gebruik is, het bestaan uit bevestigende statistiek, Cronbach alfa koëffisiënte, eksploratiewe faktorontleding, Pearson produk-moment korrelasie koëffisiënte en strukturele vergelykingsmodelleringsmetodes.

Die resultate van die navorsing het aangedui dat die beskikbaarheid van leiers se bemagtigingsgedrag (d.w.s. delegering van gesag, selfgeleide besluitneming, die deel van inligting en afrigting vir innoverende prestasie), selfdoeltreffendheid en werkhulpbronne (d.i. toesighouding, hulpbronbesikbaarheid en outonomie) hoër vlakke van werksverwante vloei in die werksplek teweeg kan bring.

Aanbevelings vir toekomstige navorsing is aan die hand gedoen.

CHAPTER 1

INTRODUCTION

This mini-dissertation focuses on predicting work-related flow in selected sectors of the chemical industry – fertiliser, petroleum and explosives. Chapter 1 introduces a problem statement, giving an overview of previous related research conducted on leader empowering behaviour, self-efficacy and job characteristics in predicting work-related flow within these sectors of the chemical industry, linking it with this research project and its research objectives. A discussion of the research method follows, with details of the empirical study, research design, participants, measuring instruments and statistical analysis. It concludes with a chapter summary giving an overview of the chapters that comprise this mini-dissertation.

1.1 PROBLEM STATEMENT

The chemical industry as a whole plays a vital role in the development and the sustainability of the South African economy. It utilises raw materials from oil, gas and mining industries and converts them into products that are used in, or further processed into, almost every physical product used by mankind, i.e. paints and coatings, food, pharmaceuticals and cosmetics, explosives, plastics and rubbers, textiles, metals and other construction materials, cleaning materials and fertilisers (Aftalion, 1991). Chemicals tend to be produced in a few large plants or factories normally situated near a source of raw materials, and then distributed, often internationally [International Council of Chemical Associations (ICCA), 2004]. Being highly intensive, the industry requires large amounts of capital to build, operate and maintain chemical plants (Aftalion, 1991). As a result, it is a globalised industry, making it difficult for small and inefficient producers to compete with world prices, and for chemical producers who do not have access to raw materials at global quality and price levels (Aftalion, 1991).

Many chemicals are dangerous to the environment and to human beings. Irresponsible production, transport and use of chemicals can be hazardous (ICCA, 2004). Although most people daily use products that would not have existed without chemicals, they do not want a chemical factory or warehouse in their back yard or chemical tankers on the world's roads, rail

networks and oceans (ICCA, 2004). This is perhaps due to the public perception that the chemical industry is dirty and dangerous.

Faced with this perception, environmental and socio-economic issues are playing a greater role in the industry than ever before (ICCA, 2004). The ICCA has created a Responsible Care programme that focuses on new and significant challenges facing the chemical industry and global society, including the growing public dialogue on sustainable development, public health issues related to the use of chemical products and the need for greater industry transparency. Coupled with this, the new world of work is characterised by competitiveness, benchmarking, technological innovation and efficiency (Tuck, 2004/2005). The chemical industry consequently needs to function at an optimal level to meet the demands of its stakeholders and employees. The industry needs leadership of the highest standard and efficient, productive workforces. According to Pretorius (1996), effective leadership is the critical success factor for future growth and prosperity in South Africa – and this is especially true for the chemical industry.

Existing research suggests that leadership empowering behaviours are important indicators, and even enablers, of job satisfaction, turnover intentions, productivity and organisational commitment (Bass & Avolio, 1993). Conger and Kanungo (1988) identify five categories of leader empowering behaviours. Hui (1994) then demonstrates how these behaviours have both direct and indirect effects on performance. *Enhancing meaningfulness of work* describes how leader behaviours can increase employees' sense of worth – and thereby their desire to make a greater effort - by extending the purpose and meaning of employee work. *Fostering participation in decision making* requires a concerted effort by leaders to seek employee input in the workplace decision-making process. *Facilitating goal accomplishment, providing autonomy and freedom from bureaucratic constraints* allow for the best utilisation of employee talents and resources for the best possible work performance outcomes by increasing employees' work autonomy and reducing bureaucratic rules and restrictions. Hui (1994) finds that by expressing confidence in high performance, leaders foster confidence in employees and display their belief in employees' abilities. Hui demonstrates in his study that leader empowering behaviours had both direct and indirect effects on performance.

According to Johnson (1994), empowerment is not created by policies or practices, but by creating an environment that fosters success by empowering employees through greater responsibility, decision-making authority, information and feedback as well as motivation, support and encouragement. It is a process of giving people the power to do the work as demanded by their position (Johnson, 1994). It is also a popular management practice, although research has been limited in identifying leaders' empowering behaviours (Konczak, Stelly & Trusty, 2000). The essence of empowerment can be described as the amplification of employees' jobs, giving them the responsibility and authority to make decisions about their work without supervisory approval while creating value for the ultimate customer (Boone & Kurtz, 1998).

Empowerment makes employees feel better about their inputs to the organisation, promotes greater productivity and provides employees with a sense of personal and professional balance (Bourke, 1998). It induces employees to seek alternative ways to do their jobs (Howard, 1997) and increases their potential for promotions and job satisfaction. Leader empowering behaviour also results in personal growth, as the process increases employees' feelings of confidence and control within themselves and their organisation (Eylon & Herman, 1999). It is a process that makes workers utilise their full potential, which enables them to support their decisions, assume risks, participate and take action (Eylon & Herman, 1999). The ability of employees to perform at an optimum level is an important predictor of flow within an organisation.

The concept of self-efficacy has also been related to better health, better self-development and greater social integration within the organisation (Bandura, 1997, 1999, 2001). There is also substantial evidence that highlights the positive effects of self-efficacy on performance and well-being in various domains, including the workplace, school and even sport (Bandura, 1999, 2001). For example, research shows that high levels of efficacy beliefs have a positive impact on employee well-being (Grau, Salanova & Peiro, 2001) and work engagement (Salanova, Llorens, Cifre, Martinez & Schaufeli, 2003). It can mitigate the negative impact of job demands on burnout (Salanova, Grau, Cifre & Llorens, 2000; Salanova, Llorens *et al.*, 2003). High self-efficacy positively affects performance; which may in turn enhance self-efficacy (Bandura, 1982). Conger and Kanungo (1988) describe a process of enhancing feelings of self-efficacy within organisations by identifying conditions that foster powerlessness and removing the formal

organisational practices and informal techniques that create these conditions. However, while self-efficacy is defined by Bandura (1982) as a self-judgment of one's ability to perform a task in a specific domain, a high degree of self-efficacy in one domain does not necessarily transfer to other areas.

Bandura (1986) identified four phenomena that affect self-efficacy:

- *Mastery experiences* refer to one's personal experience with success or failure. For example, the positive experience of a good performance in an appraisal will influence the perception of one's ability in that field.
- *Vicarious experiences*, in which self-efficacy can be effected by observing the experiences of others. People who see a process successfully performed in a given situation are more likely to believe that they can acquire the same skill (Alderman, 1999).
- *Verbal persuasion*, where employees and managers are motivated to perform optimally by using verbal feedback.
- *Physiological state*. People often experience changed physical or mental states when faced with challenges that require high levels of competence. Such physical or mental states reflect perceptions of their self-efficacy, which affect their performance.

There are various ways of raising levels of self-efficacy, which in turn will improve the chances of the managers and employees reaching a state of flow. According to Bandura (1997, 2001), efficacy beliefs contribute to motivation in several ways. Efficacy beliefs influence (a) the challenges people pursue, (b) the effort they expend, and (c) their perseverance in the face of obstacles. Thus, the assumption can be made that self-efficacy and flow can lead to enhanced performance, even though the literature regarding the relationship between self-efficacy and flow is still relatively limited.

In contrast, a lack of organisational resources has a detrimental effect on workers' motivation and performance (Wong, Hui & Law, 1998) since it precludes actual goal accomplishment and undermines employees' learning opportunities (Kelly, 1992). This is consistent with the Conservation of Resources (COR) theory (Hobfoll, 1989, 1998, 2002) that suggests that people

seek to obtain, retain and protect resources. Stress occurs when resources are threatened or lost, or when individuals fail to gain resources. Resources can include objects, personal characteristics, conditions and energies. However, the two principal types of resources that have been examined within the COR framework are personal and psychosocial resources (Hobfoll, Johnson, Ennis & Jackson, 2003). The present study will focus specifically on self-efficacy (that is, a personal resource), as well as job characteristics.

Researchers generally agree that the occurrence of flow is most likely when people perceive a balance between the challenge of a situation and their own skills to deal with this challenge (Salanova *et al.*, 2006). In other words, a complete form of flow appears most clearly when there is a balance between job demands and job resources (Schaufeli & Bakker, 2004). Demerouti, Bakker, Nachreiner and Schaufeli (2001) define job resources as those physical, psychological, social or organisational aspects of the job that: (1) are functional in achieving work goals; (2) reduce job demands and the associated physiological and psychological costs; and (3) stimulate personal growth and development. Examples of job and organisational resources in the chemical industry are social support from colleagues, performance feedback, quality material, supervisory coaching, skill variety and job control. Job resources are not only necessary to deal with job demands, but they are also important in their own right (Elsass & Veiga, 1997). Research on the Job Demands–Resources (JD-R) model has shown that job resources contribute positively to the motivation and performance of individuals (Bakker, 2005). Schaufeli and Bakker (2004) find that when individuals are able to balance their job demands and job resources, they will be more open to positive experiences (such as flow) in the work situation.

Houkes (2002) includes several job resources in her research among bank employees and teachers, and found evidence for a causal relationship between the motivating potential score (an additive index, including skill variety, task identity, task significance, autonomy and job feedback) and intrinsic work motivation. Intrinsic motivation leads to enhanced performance, persistence and creativity and also higher self-esteem and subjective well-being (Carr, 2004).

Bakker, Demerouti, De Boer and Schaufeli (2003) have shown that production workers' organisational resources foster organisational commitment, which reduces absence levels from

work. Furthermore, Bakker, Demerouti and Verbeke (2004) demonstrate that greater levels of resources foster work engagement. This is predictive of important organisational outcomes, including proactive behaviour (Salanova, Carrero, Pinazo & Schaufeli, 2004), service climate (Salanova, Agut & Peiró, 2004), and group performance (Swart, 2006; Salanova *et al.*, 2003). Other studies relating organisational resources to work-related flow have provided additional evidence for the motivational potential of resources. Salanova *et al.* (2003) argue that organisational resources can be important predictors of work engagement, which, in turn, is predictive of important organisational outcomes, including service climate and group performance. According to Salanova *et al.* (2006), there are clear reciprocal relationships between resources and flow. On the basis of a brief literature study, they assumed that flow develops over time when personal and organisational resources are sufficiently available, because these positive aspects foster flow experiences.

Flow is defined as a state of consciousness where people become totally immersed in an activity and enjoy it intensely (Salanova, Bakker & Llorens, 2006). Flow experiences occur when one becomes engaged in controllable, but challenging, tasks or activities that require considerable skill and which are intrinsically motivating (Carr, 2004). Csikszentmihalyi (1990) describes flow as the state in which people are so intensely involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it, even at great cost, for the sheer sake of doing it. Bakker (2005) applied the concept of flow to the work situation, and defines flow as a short-term peak experience at work that is characterised by absorption, work enjoyment and intrinsic work motivation. *Absorption* refers to a state of total concentration, whereby employees are totally immersed in their work (Salanova *et al.*, 2006). They forget about time and everything else around them. Bakker (2005) cites the work of Veenhoven (1984), showing that employees who *enjoy* their work and feel happy make a very positive judgment about the quality of their working life. *Intrinsic work motivation* refers to the need to perform a certain work-related activity with the aim of experiencing the inherent pleasure and satisfaction in the activity. Flow is achieved when all levels of consciousness are in harmony with one another (Csikszentmihalyi, 1997).

No studies could be found in literature around the relationship between leader empowering behaviour, self-efficacy, job characteristics and work-related flow among employees in the chemical industry in South Africa. It is the aim of this research to investigate such a relationship within a sample of employees in selected sectors of the chemical industry in South Africa and to make recommendations based on the findings.

From the problem statement the following research questions emerge:

- How is leader empowering behaviour, self-efficacy, job characteristics and work-related flow conceptualised in the literature?
- According to the literature, what is the relationship between leader empowering behaviour, self-efficacy, job characteristics and work-related flow?
- How valid and reliable are the measurements of leader empowering behaviour, self-efficacy, job characteristics and work-related flow for the chemical industry?
- What is the relationship between leader empowering behaviour, self-efficacy, job characteristics and work-related flow in the chemical industry?
- Does the availability of leader empowering behaviour, self-efficacy and job characteristics enhance the experience of work-related flow?
- What is the difference in the experience of work-related flow based on demographic groups?

1.2 RESEARCH OBJECTIVES

The research objectives are divided into a general objective and specific objectives.

1.2.1 General Objective

With reference to the given formulation of the problem, the general objective of this research is to determine the predicting relationship of leader empowering behaviour, self-efficacy and job characteristics on work-related flow of employees in the chemical industry. More specifically, the current study will examine whether personal and organisational resources facilitate flow at

work; whether employees who experience flow mobilise more resources over time; and the roles of leader empowering behaviour and self-efficacy in this process.

1.2.2 Specific Objectives

The specific research objectives are as follows:

- To conceptualise leader empowering behaviour, self-efficacy, job characteristics and work-related flow in the literature.
- To determine the relationship between leader empowering behaviour, self-efficacy, job characteristics and work-related flow according to the literature.
- To determine the construct equivalence and internal consistency of the measuring instruments of leader empowering behaviour, self-efficacy, job characteristics and work-related flow in selected sectors of the chemical industry.
- To determine the relationship between leader empowering behaviour, self-efficacy, job characteristics and work-related flow in a sample of employees in these sectors of the chemical industry.
- To determine whether leader empowering behaviour, self-efficacy and job characteristics enhance the experience of work-related flow in a sample of employees in these sectors.
- To determine the disparities in the experience of work-related flow in a sample of employees in selected sectors of the chemical industry.

1.3 RESEARCH METHOD

The research method consists of a literature review and an empirical study. The results obtained from the research are presented in the form of a research article.

1.3.1 Literature Review

The literature review focuses on previous research on leader empowering behaviour, self-efficacy, job characteristics and work-related flow. An overview is given of the current conceptualisation of these constructs. The results are then used to determine the relationship between leader empowering behaviour, self-efficacy, job characteristics and work-related flow in a sample of employees in the chemical industry.

1.3.2 Research Design

A cross-sectional survey design was used to collect the data and to attain the research objectives. Cross-sectional designs were used to examine groups of subjects in various stages of development simultaneously (Burns & Grove, 1993) in a short period of time, which may vary from one day to a few weeks. The survey is a data collection technique in which questionnaires were used to gather data about an identified population. This design was also used to assess the interrelationship among variables within a population (Shaughnessy & Zechmeister, 1997). The cross-sectional research design was best suited to address the descriptive and predictive functions associated with the correlational design that examines relationships between variables.

1.3.3 Participants

An availability sample ($N = 213$) was taken from employees working in three different companies in the chemical industry. A total number of 300 employees were targeted, with only 213 responding (71%) of which 100% could be used.

The majority of participants were white (68,10%) married males (64,30%) between the ages of 30 and 39 (39,00%) with a grade 12 / matric / N3 qualification (39,40%). Half of the participants were in a supervisory position (50,20%). A total of 48,80% of the participants worked in the chemicals department.

1.3.4 Measuring Battery

Four questionnaires were administered to measure leader empowering behaviour, self-efficacy, job characteristics and work-related flow. A biographical questionnaire was also included to describe the population.

The *Leader Empowering Behaviour Questionnaire* (LEBQ) (Konczak *et al.*, 2000) is a 17-item scale that measures leader empowering behaviour. Items are measured on a 7-point Likert scale ranging from 1 (strongly agree) to 7 (strongly disagree). Thus high scores indicate higher perceptions of empowering leader behaviours. The LEBQ has shown internal consistency ratings ranging from 0,85 to 0,90 (Konczak *et al.*, 2000; Laramore, 1997). Maré (2007) finds in a sample of employees in the gold mining industry that the LEBQ can consist either of one factor or six factors. She obtained alpha coefficients ranging from 0,57 to 0,78.

The *General Perceived Self-Efficacy Scale* (GPSES) (Schwarzer & Jerusalem, 1995) was used to measure participants' generalised self-efficacy. The GPSES consists of 10 items. According to Schwarzer and Jerusalem (1995), alpha coefficients of the GPSES vary from 0,75 to 0,90 and it is valid in terms of convergent and discriminant validity. The research of Rothmann and Van Rensburg (2001) showed a reliability coefficient of 0,80. Kriese (2007) found an alpha coefficient of 0,85 in a sample of employees working in the chemical industry.

The *Job Demands and Resources Scale* (JDERS) was developed by Le Roux (2005) to measure unique job demands and job resources of employees in the mining industry. This questionnaire was adapted to be suitable for the chemical industry. The items were measured on a four-point scale, ranging from 1 (*never*) to 4 (*always*). Le Roux (2005) found that ten factors could be extracted in the mining industry, explaining 52,25% of the total variance. These factors were labelled: supervision, working conditions, workload, task freedom, support, pay and benefits, opportunity for growth, job security, resources availability and working hours. The alpha coefficients she obtained varied from 0,72 to 0,89. The internal consistency and construct validity of the scale would be determined in the chemical industry.

Flow at work was assessed with the *Work-related Flow scale* (WOLF; Bakker, 2001). The WOLF includes 13 items measuring absorption (4 items), work enjoyment (4 items), and intrinsic work motivation (5 items). The participants were asked to indicate how often they had each of the experiences during the preceding week (0 = never, 6 = every day). Bakker (2001) found the following reliability results: Absorption (0,80); Work enjoyment (0,90); and Intrinsic Work Motivation (0,75). In a South African study on employees in the mining industry, Le Roux (2005) found the following Cronbach alphas: Absorption (0,59), Work Enjoyment (0,84) and Intrinsic Work Motivation (0,71). In a study on call centre agents, Swart (2006) found that two factors could be extracted explaining 63,92% of the total variance. These factors were labelled Absorption ($\alpha = 0,88$) and Flow (consisting of Work Enjoyment and Intrinsic Work Motivation) ($\alpha = 0,82$).

A *biographical questionnaire* was developed to gather information on the demographic characteristics of the participants. Information gathered includes age, gender, race, home language, education, marital status and years employed in current position.

1.3.5 Statistical Analysis

The statistical analysis was conducted by means of the SPSS-programme (SPSS Inc., 2007). Descriptive statistics (e.g. means, standard deviations, skewness and kurtosis) was used to analyse the data. Cronbach alpha coefficients were used to determine the internal consistency, homogeneity and unidimensionality of the measuring instruments (Clark & Watson, 1995). Coefficient alpha contains important information on the proportion of variance of the items of a scale in terms of the total variance explained by that particular scale.

Pearson product-moment correlation coefficients were used to specify the relationships between the variables. In terms of statistical significance, it was decided to set the value at a 95% confidence interval level ($p \leq 0,05$). Effect sizes (Steyn, 1999) were used to determine the practical significance of the findings. A cut-off point of 0,30 (medium effect) (Cohen, 1988) was set for the practical significance of correlation coefficients.

Multiple regression analyses were conducted to determine the percentage variance in the dependent variables (i.e. work-related flow) that were predicted by the independent variables (i.e. job characteristics, leader empowering behaviour and self-efficacy). The effect size (which indicates practical significance) in the case of multiple regressions is given by the following formula (Steyn, 1999):

$$f^2 = R^2 / 1 - R^2$$

A cut-off point of 0,35 (large effect) (Steyn, 1999) was set for the practical significance.

Multivariate analysis of variance (MANOVA) was used to determine the significance of differences between the levels of work-related flow of demographic groups. MANOVA tests whether or not mean differences among groups in a combination of dependent variables are likely to have occurred by chance (Tabachnick & Fidell, 2001). In MANOVA, a new dependent variable that maximises group differences was created from the set of dependent variables. Wilk's Lambda was used to test the likelihood of the data, on the assumption of equal population mean vectors for all groups, against the likelihood on the assumption that the population mean vectors are identical to those of the sample mean vectors for the different groups. When an effect was significant in MANOVA, one-way analysis of variance (ANOVA) was used to discover which dependent variables had been affected. As multiple ANOVAs were used, a Bonferroni-type adjustment was made for inflated Type I error. Tukey tests were conducted to indicate which groups differed significantly when ANOVAs were performed.

1.4 DIVISION OF CHAPTERS

The chapters are presented as follows in this mini-dissertation:

Chapter 1: Introduction

Chapter 2: Research Article

Chapter 3: Conclusions, Limitations and Recommendations

1.5 CHAPTER SUMMARY

Within this chapter an overview is given on the problem statement and research objectives. The measuring instruments and research method used in this research are explained, followed by a brief overview of the chapters that follow.

The empirical study is discussed in Chapter 2.

REFERENCES

- Aftalion, F. (1991). *A History of the International Chemical Industry* (Chemical Sciences in Society Series). Philadelphia, Pennsylvania: University of Pennsylvania Press.
- Alderman, M. K. (1999). *Motivation for achievement: Possibilities for teaching and learning*. New Jersey, NJ: Lawrence Erlbaum Associates, Inc.
- Bakker, A. B. (2001). *Questionnaire for the Assessment of Work-related Flow: The WOLF*. Department of Social and Organizational Psychology, Utrecht University, The Netherlands.
- Bakker, A. B. (2005). Flow among music teachers and their students: The crossover of peak experiences. *Journal of Vocational Behavior*, 66, 26–44.
- Bakker, A. B., Demerouti, E., De Boer, E. & Schaufeli, W. B. (2003). Job demands and job resources as predictors of absence duration and frequency. *Journal of Vocational Behavior*, 62, 341-356.
- Bakker, A. B., Demerouti, E. & Verbeke, W. (2004). Using the Job Demands-Resources model to predict burnout and performance. *Human Resource Management*, 34(1), 83-104.
- Bandura, A. (1982). Self-efficacy mechanisms in human agency. *American Psychologist*, 37, 122-147.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bandura, A. (1999). Social cognitive theory of personality. In L. Pervin & O. John (Eds.), *Handbook of personality* (2nd ed.) (p. 154-196). New York: Guilford.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1–26.
- Bass, B. M. & Avolio, B. J. (1993). Transformational Leadership and Organizational Culture. *Public Administration Quarterly*, 17(1): 112-122.
- Boone, L. E. & Kurtz, D. (1998). *Contemporary Marketing*. Texas: The Dryden Press.
- Bourke, J. F. (1998). Employee empowerment. *Dallas Business Journal*, 21(46), 101-109.
- Burns, N. & Grove, S. K. (1993). *The practice of nursing research, conduct, critique, and utilization* (2nd ed.). Philadelphia: W.B. Saunders.

- Carr, A. (2004). *Positive Psychology: The science of happiness and human strength*. New York: Brummer-Routledge.
- Clark, L. A. & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7, 309-319.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (rev. ed.). Orlando, FL: Academic Press.
- Conger, J. A. & Kanungo, R. N. (1988). The empowerment process: Integrating theory and practice. *Academy of Management Review*, 13, 471-482.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: HarperCollins.
- Csikszentmihalyi, M. (1997). *Finding flow: The psychology of engagement with everyday life*. New York: HarperCollins.
- Demerouti, E., Bakker, A. B., Nachreiner, F. & Schaufeli, W. B. (2001). The Job Demands-Resources model of burnout. *Journal of Applied Psychology*, 86, 499-512.
- Elsass, P. M. & Veiga, J. F. (1997). Job control and job strain: A test of three models. *Journal of Occupational Health Psychology*, 2, 195-211.
- Eylon, D. & Herman, S., (1999). Exploring empowerment: One method for the classroom. *Journal of Management Education*, 23(1), 42-47.
- Grau, R. M., Salanova, M. & Peiro, J. M. (2001). Moderating effects of self-efficacy on occupational stress. *Psychology in Spain*, 5, 63-74.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, 44, 513-524.
- Hobfoll, S. E. (1998). *Stress, culture, and community: The psychology and philosophy of stress*. New York: Plenum.
- Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology*, 6, 307-324.
- Hobfoll, S. E., Johnson, R. E., Ennis, N. & Jackson, A. P. (2003). Resource loss, resource gain and emotional outcomes among inner city women. *Journal of Personality and Social Psychology*, 84, 632-643.

- Houkes, I. (2002). *Work and individual determinants of intrinsic work motivation, emotional exhaustion and turnover intention*. Unpublished Doctoral thesis, Maastricht University. Maastricht, The Netherlands.
- Howard, A. (1997). High-involvement leadership: Moving from talk to action. *Career Development International*, 1, 6-10.
- Hui, C. (1994). *Effects of Leader Empowerment Behaviours and Followers' Personal Control, Voice and Self-Efficacy on In-Roll and Extra-Roll Performance: An Extension and Empirical Test of Conger and Kanungo's Empowerment Process Model*. Dissertation from Proquest Information and Learning (UMI No. 9418834).
- International Council of Chemical Associations (ICCA) (2004). *Responsible Care Global Charter*. Retrieved from the World Wide Web on September 2007 www.icca-chem.org/pdf/Responsible%20Care%20Global%20Charter%20 (ICCA supplement to Chemicalweek).
- Johnson, P. R. (1994). Brains, heart and courage: keys to empowerment and self-directed leadership. *Journal of Managerial Psychology*, 9(2), 17-21.
- Kelly, J. E. (1992). Does job re-design theory explain job re-design outcomes? *Human Relations* 45, 753-774.
- Konczak, L. J., Stelly, D. J. & Trusty, M. L. (2000). Measuring Empowering Behaviors of Managers: Development of an Upward Feedback Instrument. *Educational and Psychological Measurement*, 60, 301-313.
- Kriese, P. (2007). *Job insecurity and self-efficacy in a chemical industry*. Unpublished master's dissertation, North-West University, Vaal Triangle Campus.
- Laramore, A. M. (1997). *The Relationship Between CEO Empowering Leadership, Transformational Leadership, and Direct Report Feelings of Empowerment: A Multi-Level Analysis*. Illinois Institute of Technology.
- Le Roux, A. (2005). *Job demands, job resources and work-related flow of employees in the mining industry in South Africa*. Unpublished master's dissertation, North-West University, Potchefstroom Campus.
- Maré, Z. (2007). *Leader empowering behaviour, organisational commitment and turnover intention within the gold mining industry*. Unpublished master's dissertation, North-West University, Potchefstroom Campus.

- Pretorius, B. (1996). The future and effective leadership. *Human Resource Management*, 12-13.
- Rothmann, S. & Van Rensburg, P. (2001). *Suicide ideation in the South African Police Services*. Paper presented at the 10th European Congress on Work and Organizational Psychology, Prague, Czech Republic, 8-10 May 2001.
- Salanova, M., Agut, S. & Peiró, J. M. (2005). Linking organizational resources and work engagement to employee performance and customer loyalty: The mediating role of service climate. *Journal of Applied Psychology*, 90(6), 1217-122
- Salanova, M., Bakker, A. B. & Llorens, S. (2006). Flow at work: Evidence for a gain spiral of personal and organizational Resources. *Journal of Happiness Studies*, 7, 1-22
- Salanova, M., Carrero, V., Pinazo, D. & Schaufeli, W. B. (2004). *Job characteristics and proactive behaviour: The mediating role of job engagement*. Manuscript submitted for publication.
- Salanova, M., Grau, R. M., Cifre, E. & Llorens, S. (2000). Computer training, frequency of usage and burnout: The moderating role of computer self-efficacy. *Computers in Human Behavior*, 16(6), p. 575-590
- Salanova, M., Llorens, S., Cifre, E., Martinez, I. & Schaufeli, W. B. (2003). Perceived collective efficacy, subjective well-being and task performance among electronic work groups: An experimental study. *Small Groups Research*, 34, 43-73.
- Schaufeli, W. B. & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behavior* 25 (3), p. 293-315
- Schwarzer, R. & Jerusalem, M. (1995). Generalized Self-efficacy Scale. In J. Weinmanr, S. Wright & M. Johnston (Eds.), *Measures in Health Psychology: A user's portfolio*. (p. 35-37). Windsor, UK: NFER-NELSON.
- Shaughnessy, J. J. & Zechmeister, E. B. (1997). *Research methods in psychology* (4th ed.). New York: McGraw-Hill.
- SPSS Inc. (2007). *SPSS 15.0 for Windows*. Chicago, IL: Author.
- Steyn, H. S. (1999). *Praktiese beduidendheid: Die gebruik van effekgroottes*. [Practical significance: The use of effect sizes.] Wetenskaplike bydraes – Reeks B: Natuurwetenskappe Nr, 117. Potchefstroom: PU vir CHO.

- Swart, J. (2006). *The relationship between job characteristics, work wellness and work-related flow of call centre agents in an insurance company*. Unpublished master's dissertation, North-West University, Potchefstroom Campus.
- Tabachnick, B. G. & Fidell, L. S. (2001). *Using multivariate statistics* (4th Ed.). Boston, MA: Allyn and Bacon.
- Tuck, M. (2004/2005). Doing Excellent Business. *Human Capital Management Journal*, 2, 21-24.
- Veenhoven, R. (1984). *Conditions of Happiness*. Kluwer, The Netherlands: Dordrecht.
- Wong, C. S., Hui, C. & Law, K. S. (1998). A longitudinal study of the job perception-job satisfaction relationship: A test of the three alternative specifications. *Journal of Occupational and Organizational Psychology*, 71, 127–146.

CHAPTER 2

RESEARCH ARTICLE

PREDICTING WORK-RELATED FLOW IN THE CHEMICAL INDUSTRY

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ABSTRACT

The objective of this research was to determine the predicting relationship of leader empowering behaviour, self-efficacy and job characteristics on work-related flow of employees in selected sectors of the chemical industry. A cross-sectional survey design was used to collect data. An availability sample ($N=213$) of employees in the chemical industry was taken. The Leader Empowering Behaviour Questionnaire (LEBQ), General Perceived Self-Efficacy Scale (GPSES), Job Demands and Resources Scale (JDERS) and the Work-reLated Flow Scale (WOLF) were used as measuring instruments. A biographical questionnaire was also included. The statistical analysis was conducted with the help of the SPSS program. The results indicated that the availability of job resources (i.e. supervision, resources availability and autonomy); leader empowering behaviour (i.e. delegation of authority, self-directed decision making, information sharing and coaching for innovative performance); and self-efficacy can result in higher levels of work-related flow.

OPSOMMING

Die doel van hierdie studie was om die voorspellende verhouding tussen leierbemaagtigingsgedrag, selfdoeltreffendheid en werkseienskappe op werksverwante vloei van werknemers in geselekteerde sektore binne die chemiese nywerheid te bepaal. 'n Dwarssnitopname-ontwerp is gebruik om data in te samel. 'n Beskikbaarheidsteekproef ($N=213$) van werknemers in die chemiese nywerheid is geneem. Die Leader Empowering Behaviour Questionnaire (LEBQ), General Perceived Self-Efficacy Scale (GPSES), Job Demands and Resources Scale (JDERS) en die Work-reLated Flow Scale (WOLF) is as meetinstrumente gebruik. 'n Biografiese vraelys is ook ingesluit. Die statistiese ontleding is met behulp van die SPSS-program uitgevoer. Die resultate het getoon dat die beskikbaarheid van werks hulpbronne (d.i. toesig, hulpbrons beskikbaarheid en outonomie); leierbemaagtigingsgedrag (d.i. delegering van gesag, selfgerigte besluitneming, deel van inligting en afrigting vir innoverende prestasie); en selfdoeltreffendheid op hoër vlakke van werksverwante vloei kan uitloop.

Globally, the chemical industry is facing new and significant challenges, including a growing public dialogue on sustainable development, public health issues related to the use of chemical products and the need for greater industry transparency [International Council of Chemical Associations (ICCA), 2004]. Among the changes facing the industry are the increased use of information and communication technology; the globalisation of the economy; the changing structure of the workforce; increasing flexibility in the world of work; the creation of the 24-hour economy; and the use of new production concepts (e.g. team-based work, telework, downsizing, outsourcing and subcontracting) (Guest, 2004).

These issues are driving changes in the workplace at an unprecedented rate (Colterayhn & Davis, 2004) from relatively stable, predictable and local circumstances to environments characterised by discontinuous change, ambiguity and globalisation. South African organisations, too, are affected by these changes. Success within this fast-paced and competitive industry is measured in terms of responsiveness, innovation, speed, flexibility and cost-effectiveness (Veldsman, 2003), with more challenges than promises (Du Preez, 2003) and demands for ever higher levels of performance. In an organisation's quest to achieve higher levels of performance, aspects that may detrimentally affect employees and their productivity levels should be attended to; for example by improving working conditions and minimising health and safety issues (Arvidsson, Akesson & Hansson, 2003).

Many organisations have implemented practices that attempt to reduce costs and increase productivity, often leading to an attitude that favours profitability over employee wellbeing (Turner, Barling & Zacharatos, 2002). The numbers employed in many workplaces are also being reduced (Guest, 2004), and the nature of work has changed from manual work to having significantly more mental and emotional demands (Turner *et al.*, 2002).

Bandura (1997) notes that the heightened anxiety, created as a result of job loss and frequent changes or transfers, tends to create feelings of uncertainty and stress among employees. These factors, in turn, produce personal consequences. Individuals feel overloaded; they feel they lack control over what they do, are not rewarded for their work, experience a breakdown in

community and their social life, are not treated fairly and have to deal with conflicting values (Strümpfer, 2003).

The increasing demand for adaptation in the modern chemical industry makes the quest to establish a motivated and committed workforce to cope in an ever-changing environment extremely important (Cilliers & Kossuth, 2002). Research indicates that employees with positive ways of cognitively and effectively appraising the world are more likely to show a readiness and willingness to exploit the resources potentially at their disposal (Antonovsky, 1984), thus enhancing their self-efficacy and work-related flow. Not addressing this issue may lead to stressors that can negatively affect employees and their productivity levels (Arvidsson, Akesson, & Hansson, 2003). Within this context of constant change, leader empowering behaviour can be a pivotal starting point in the way employees respond to their work environment (Frischer, 2006).

Leader Empowering Behaviour

Johnson (1994) describes leader empowering behaviour as a process of giving people the power to do work as it is demanded by their positions. It further creates an environment that fosters success by empowering employees through greater responsibility, decision-making authority, information, feedback, motivation, support and encouragement (Johnson, 1994). According to Menon (2001), employee empowerment can be conceptualised in three major categories, namely an act of granting power to the person(s) being empowered; a process that leads to the experience of power; and a psychological state that manifests itself in cognitions that can be measured. Employee empowerment is a consequence of management style; it is not an action (Kahnweiler, 1991). Collins (2003) describes it as a process of helping people to help themselves or leading people to learn to lead themselves, making them feel better about their contribution to the organisation and providing them with a sense of personal and professional balance. Leader empowering behaviour therefore results in personal growth through expanding employees' feeling of confidence and control (Eylon & Herman, 1999). This process makes workers utilise their full potential, enabling them to support their decisions, assume risks, participate and take action (Eylon & Herman, 1999).

According to Vogt and Murrell (1990), leader empowering behaviour creates a mutually beneficial situation. Customers benefit from engaged employees; organisations benefit from satisfied customers and engaged employees; and employees benefit from improving their confidence and self-esteem. In the process of measuring leader empowering behaviour, Konczak, Stelly and Trusty (2000) developed items to measure certain identified dimensions of leader empowering behaviour. Using confirmatory factor analysis to evaluate the factor structure of the hypothesised dimensions comprising an instrument called the Leader Empowering Behaviour Questionnaire (LEBQ) (Konczak *et al.*, 2000), they found that a six-factor structure best fitted the data. Maré (2007) found in a sample of employees in the South African gold mining industry that the LEBQ can consist either of one factor or six factors.

The dimensions identified by Konczak *et al.* (2000) are:

- *Delegation of Authority*: refers to an empowering behaviour on the part of the manager (Conger & Kanungo, 1988). It appears that when subordinates are excluded from the delegating process, it results in low morale and performance.
- *Accountability for Outcomes*: refers to leaders holding their employees accountable for work outcomes and motivating them through recognition for team member performance (Blanchard, Carlos & Randolph, 2001).
- *Self-Directed and Participative Decision Making*: leading to employees' heightened feelings of self-efficiency (Tannenbaum, 1986).
- *Information Sharing*: enabling employees to contribute optimally to organisational performance (Ford & Fottler, 1995).
- *Skills Development*: refers to leaders spending time on facilitating appropriate training to ensure increased levels of competence (Konczak *et al.*, 2000).
- *Coaching*: refers to a set of behaviours educating employees to become self-reliant and subsequently more productive (Konczak *et al.*, 2000).

Leader behaviour influences employee behaviour, impacting on productivity in the organisation. Treating employees fairly could increase their trust in the organisation and, consequently, positively affect levels of organisational commitment (Whitener, 2001). Leader empowering

behaviour also results in personal growth, as the process increases employees' feelings of confidence and control in themselves and within their organisation (Eylon & Herman, 1999). Employees' ability to perform at an optimum level is an important predictor of flow within an organisation.

Another strong indicator of flow is the concept of self-efficacy, which has also been related to better health, better self-development and greater social integration within the organisation (Bandura, 1997, 1999, 2001). There is further substantial evidence that highlights the positive effects of self-efficacy on performance and well-being in various domains, including the workplace (Bandura, 1999, 2001).

Self-efficacy

Self-efficacy is defined by Bandura (1982) as a self-judgment of one's ability to perform a task in a specific domain. Bandura (1977) argues that behaviour is strongly stimulated by self-influence. Although high self-efficacy affects performance, a high degree of self-efficacy in one domain does not necessarily transfer a high degree of self-efficacy to other areas of endeavour (Bandura, 1982). There is considerable evidence regarding the positive effects of self-efficacy on well-being (Bandura, 1999, 2001). High levels of efficacy beliefs have a positive impact on employee well-being (Grau, Salanova & Peiro, 2001) and work engagement (Salanova, Llorens, Cifre, Martinez & Schaufeli, 2003), and can buffer the negative impact of job demands on burnout (Salanova, Grau, Cifre & Llorens, 2000; Salanova *et al.*, 2003). Apart from this buffer in stress processes, self-efficacy has also been related to better health, better self-development and greater social integration (Bandura, 1997, 1999, 2001).

There are various means of strengthening self-efficacy, which will, in turn, improve employee's chances of reaching a state of flow. Conger and Kanungo (1988) describe a process of enhancing feelings of self-efficacy within organisations by identifying conditions that foster powerlessness and removing the practices and techniques that create them. According to Bandura (1997, 2001), efficacy beliefs contribute to motivation by influencing the challenges people pursue, the effort they expend and their perseverance in the face of obstacles. Further to this, Carr (2004) shows

that intrinsic motivation leads to enhanced performance, persistence and creativity as well as higher self-esteem and subjective well-being. It can thus be assumed that self-efficacy and flow can lead to enhanced performance. The literature regarding the relationship between self-efficacy and flow is, however, still relatively limited.

Another important element in determining indicators of flow in the workplace is job characteristics. The literature suggests that, while job resources possess motivational potential, a lack of job resources may have detrimental effects on workers' motivation and performance (Wong, Hui & Law, 1998), eventually leading to disengagement from work (cynicism) and a reduced sense of professional efficacy (Bakker, Demerouti, Taris, Schaufeli & Schreurs, 2002).

Job Characteristics

The Job Demands-Resources (JD-R) model proposed by Demerouti, Bakker, Nachreiner and Schaufeli (2001) is a heuristic model that specifies how involvement in any organisation may be produced by two specific sets of working conditions, namely job demands and job resources. Job demands represent characteristics of the job that potentially evoke strain in cases where they exceed the employee's adaptive capability (Bakker, Demerouti & Schaufeli, 2003). Job resources refer to those physical and organisational aspects of the job that are functional in meeting job demands (Bakker & Geurts, 2004). Demerouti *et al.* (2001) define job resources as those physical psychological, social or organisational aspects of the job that: (1) are functional in achieving work goals, (2) reduce job demands and the associated physiological and psychological costs, and/or (3) stimulate personal growth and development. Examples of job and organisational resources are social support from colleagues, performance feedback, good material, supervisory coaching, skill variety and job control. Job resources are not only necessary to deal with job demands, but are also important in their own right (Elsass & Veiga, 1997).

Stressors affecting employee performance seem to be closely related to job characteristics at organisational level (e.g. job security); interpersonal level (e.g. supervisor support); work level (e.g. role clarity); and task level (e.g. performance feedback) (Bakker, Demerouti, De Boer & Schaufeli, 2001; Hackman & Oldham, 1975). High job demands (i.e. work overload) may

exhaust employees' mental and physical resources and therefore lead to health problems (Demerouti *et al.*, 2001). Deficient job resources are likely to result in failure and frustration that might lead to withdrawal from work and reduced motivation and commitment (Bakker *et al.*, 2003). According to Hackman and Oldham (1975), high job demands and low resources may lead to reduced commitment as a self-protection mechanism to prevent the future frustration of not obtaining work-related goals.

There is often a negative correlation between job demands and resources, since excessive job demands - such as high work pressure - may negatively affect the mobilisation of job resources. Conversely, high job resources, such as social support and feedback, may reduce job demands. In simple terms, low job demands and low job resources will result in a boring job. Low job demands and high job resources will result in an unchallenging job. High job demands and low job resources create a stressful work situation. In a challenging job, there will be high job demands and high job resources (Demerouti, Bakker, Nachreiner & Schaufeli, 2001).

The Job Demands-Resources model proposes that a person's wellbeing is the result of two relatively independent processes (Bakker *et al.*, 2003). In the first process, the demanding aspects of work leads to constant overtaxing. In the second process, the availability of job resources may help employees cope with demanding aspects of their job, even stimulate and motivate them to learn from and grow (Bakker & Geurts, 2004). However, a lack of job resources will likely cause failure and frustration, and ultimately burnout (Demerouti, Bakker, Nachreiner & Schaufeli, 2000; Leiter, 1993).

Bakker *et al.* (2002) distinguish two types of job resources: (1) resources that are extrinsic to the job (e.g. financial rewards and social support) and (2) resources that are intrinsic to the job (e.g. autonomy, feedback and professional development). The former have been identified by Herzberg (1966) as "hygiene factors", whereas the latter have also been termed "motivation factors".

Bakker's (2005) study relating organisational resources to work-related flow provides additional evidence for the motivational potential of resources. Reciprocal relationships were also found between resources and flow in studies by Salanova, Bakker and Llorens (2006) and in South

Africa by Le Roux (2005), who found that job resources (i.e. supervision, task freedom, support, pay and benefits, opportunity for growth and resources availability) predicted work-related flow.

Work-related flow

According to Bakker (2004), flow is a state where people are engaged in an activity with high involvement, concentration and enjoyment, and where they experience an intrinsic interest and a sense of time distortion. Work-related flow has also been defined as a process of optimal experience (Csikszentmihalyi, 1975, 1988, 1992, 1993, 1997) as the consequence of a situation in which challenges faced by an individual are equal to his or her skills (Ellis, Voelkl & Morris, 1994; Ghani & Deshpande, 1994). Flow experiences occur when one becomes engaged in controllable but challenging tasks or activities that require considerable skill and that are intrinsically motivating (Carr, 2004). Seligman and Csikszentmihalyi (2000) distinguish, within the scope of positive psychology, between pleasure and enjoyment. Pleasure is regarded as the good feeling that comes from satisfying homeostatic needs such as hunger, sex and bodily comfort. Enjoyment, on the other hand, refers to the good feelings people experience when they break through the limits of homeostasis; thus referring to accomplishing something that stretches them beyond what they previously were (Bryce & Haworth, 2002). Enjoyment, rather than pleasure, has been found to lead to personal growth and long-term happiness (Bryce & Haworth, 2002).

Bakker (2005) conceptualises flow in terms of the work situation, and further identifies three elements of flow. The first element, *absorption*, refers to total concentration and immersion in the activity (Csikszentmihalyi, 1990; Ghani & Deshpande, 1994; Ghani, Supnick & Rooney, 1991; Lutz & Guiry, 1994; Webster, Trevino & Ryan, 1993). The second element of flow is *enjoyment* (Csikszentmihalyi, 1990; Ghani *et al.*, 1991). Employees who enjoy their work and feel happy make a very positive judgment about the quality of their working life (Bakker, 2005). The third and final element, *intrinsic motivation*, refers to the state in which people do what they do 'even at great cost, for the sheer sake of doing it' (Csikszentmihalyi, 1990; Ellis *et al.*, 1994).

Studies by Csikszentmihalyi and LeFevre (1989) and Haworth and Evans (1995) found that the vast majority of flow experiences are felt when people are at work rather than during leisure time and that managers and supervisors tend to experience more flow than clerical or blue-collar workers (Csikszentmihalyi, 1990). Csikszentmihalyi (1999, 2003) further identifies several external factors that determine whether an individual will experience flow, namely clear goals, feedback, control and the fit between challenges and skills. Because of a structure that allows for goals being set, clear feedback being given and the link between skills and challenges, a work environment can easily provide the ideal setting for experiencing flow (Bryce & Haworth, 2002).

The degree to which employees experience flow is determined by their perception of their challenges, and whether or not they possess the necessary skills to keep pace with rapid technological development (Harvan, Visser & Crous, 2003). Flow occurs when a person faces a clear set of goals that require appropriate responses (Csikszentmihalyi, 1997). If it is clear to employees where they can place their work within the 'whole' of the organisation, or if they experience a clear task identity, they will be more likely to experience flow. According to Hackman and Oldham (1975), employees need an identifiable piece of work to perform effectively. Csikszentmihalyi (1997) further regards immediate feedback on this piece of work as a necessary condition to experience flow.

Csikszentmihalyi (1997), Fried and Ferris (1987) and Hackman and Oldham (1975) consider the sense of autonomy as another important element promoting the experience of flow. Employees' freedom in scheduling their work and determining their methods have repeatedly been found to increase positive affect (Saavedra & Kwun, 2000) and motivation (Fried & Ferris, 1987). This sense of effortless action in moments that stand out as the best in one's life (Csikszentmihalyi, 1997), where people become totally immersed in an activity and enjoy it intensely (Salanova *et al.*, 2006), is a typical description of flow. Csikszentmihalyi (1990, p. 3-4) describes flow as "a state in which people are so intensely involved in an activity that nothing else seems to matter; the experience itself is so enjoyable that people will do it even at great cost, for the sheer sake of doing it". According to May, Gilson and Harter (2004), people seek fulfilment through self-expression at work, engrossing themselves cognitively, emotionally and physically in their work.

In a “flow” state, little conscious control is necessary for actions (Csikszentmihalyi, 1975). Flow is achieved when all levels of consciousness are in harmony with each other (Csikszentmihalyi, 1975; 1988; 1993; 1997). Attention is narrowed to specific stimuli and the sense of consciousness about the self is lost as one merges with the activity itself (May *et al.*, 2004). Furthermore, individuals experiencing flow need no external rewards or goals to motivate them, as the activity itself presents constant challenges (Csikszentmihalyi, 1975).

It is assumed that flow develops over time when personal and organisational resources are sufficiently available (Salanova *et al.*, 2006). This assumption is supported by studies conducted internationally by Bakker, Demerouti and Verbeke (2004), and in South Africa by Le Roux (2005) and Swart (2006), where the results indicate a reciprocal relationships between resources and work-related flow. This supports the “broaden-and-build” theory in which positive emotions are building resources, which in turn spur positive emotions (Fredrickson, 2002). Positive emotions “broaden” people’s momentary thought-action repertoires and “build” their enduring personal resources (Bakker *et al.*, 2004). In research positive emotions such as joy, happiness and interest are shown to build enduring personal resources including physical, intellectual, social and psychological resources (Fredrickson, 2002). A momentary experience of positive emotions can build enduring psychological resources and trigger upward spirals toward emotional well-being. Thus, positive emotions do not only make people feel good for the moment, but also in the future (Fredrickson & Joiner, 2002). Experiences of positive emotions, such as flow at work, build people’s enduring personal resources (Bakker *et al.*, 2004).

This experience of positive emotion is further enhanced by leader empowering behaviour (as discussed above), which results in further personal growth for employees, as the process improves their feelings of confidence and control within themselves and their organisation (Eylon & Herman, 1999). It is a process that makes workers utilise their full potential which enables them to support their decisions, assume risks, participate and take action (Eylon & Herman, 1999).

This mobilisation of resources and the deployment of leadership empowering behaviours relate strongly to the notion of self-efficacy, which refers to a broad sense of personal competence to

deal effectively with a variety of stressful situations (Schwarzer & Luszczynska, 2007). The literature suggests that self-efficacy can be positively affected by various interventions (Schwarzer, 1998). Luthans and Youssef (2004) also describe self-efficacy as a state that can be developed through workplace interventions and proactive management.

Studies have found that a strong sense of self-efficacy is related to better health (Maddux, 1995; Schwarzer, 1992). In addition, Bandura (1986) has shown that self-efficacy has an influence on the amount of effort employees put into their jobs and whether employees are able to persist when faced with obstacles that will influence job performance, including organisational citizenship behaviour. It is therefore expected that people with higher levels of self-efficacy will experience better health and demonstrate more organisational citizenship behaviour.

If work-related flow can be viewed as a consequence of a proper balance between job demands and job resources, then it seems that job demands and job resources are role players within the accumulation of self-efficacy. Given the fact that leader empowering behaviour and self-efficacy are indicators of the existence of work-related flow, Bakker (2004) suggests that they could be combined in a model of wellbeing. Bakker (2004) found that when individuals are able to balance their job demands and job resources, they will be more open to positive experiences (such as flow) in the work situation, which may result in better performance by that individual.

Although there is no direct empirical evidence that job resources are related to work-related flow, indirect evidence suggests it (Csikszentmihalyi, 1997; Le Roux, 2005). Within South Africa, and specifically within the selected sectors of the chemical industry, no research could be found investigating the relationship between leader empowering behaviour, self-efficacy, job resources and work-related flow. Therefore, it is important to determine the relationship between these constructs within these selected sectors of the chemical industry and to determine whether the experience of work-related flow mobilises job resources.

Based on the discussion above, the following hypotheses are made:

H₁: There are practical and statistical significant relationships between leader empowering behaviour, self-efficacy, job resources and work-related flow in selected sectors in the chemical industry.

H₂: Leader empowering behaviour, self-efficacy and job resources lead to higher levels of work-related flow.

METHOD

Research design

A cross-sectional survey design was used to collect the data and to attain the research objectives. Cross-sectional designs were used to simultaneously examine groups of subjects at various stages of development (Burns & Grove, 1993) in a short period of time, which can vary from one day to a few weeks. The survey is a data collection technique in which questionnaires were used to gather data about an identified population. This design was also used to assess the interrelationship among variables within a population (Shaughnessy & Zechmeister, 1997). The cross-sectional research design was best suited to address the descriptive and predictive functions associated with the correlational design, whereby relationships between variables are examined.

Participants

An availability sample ($N = 213$) was taken from employees working in selected sectors of the chemical industry. A total number of 300 employees were targeted, but only 71% responded, of which 100% could be used. Descriptive information of the sample is given in Table 1.

Table 1

Characteristics of Participants

Item	Category	Frequency	Percentage
Job Levels	Level 3	2	0,90
	Level 4	13	6,10
	Level 5A	32	15,00
	Level 5B	14	6,60
	Level 6C	19	8,90
	Level 6	31	14,60
	Level 7	70	32,90
	Level 8	15	7,00
	Level 9	5	2,30
	Level 10	12	5,60
Gender	Male	137	64,30
	Female	76	35,70
Age	20 to 29 years	50	23,30
	30 to 39 years	83	39,00
	40 to 49 years	46	21,50
	50 years and older	34	16,00
Racial groups	White	145	68,10
	African	49	23,00
	Coloured	6	2,80
	Indian	12	5,60
	Other	1	0,50
Language	Afrikaans	124	58,20
	English	38	17,80
	African	50	23,50
	Missing Values	1	0,50
Supervisor Role	Yes	107	50,20
	No	106	49,80
Industry	Chemicals	104	48,80
	Petroleum	12	5,60
	Fertiliser	36	16,90
	Explosives	60	28,20
	Missing Values	1	0,50
Marital Status	Single	45	21,10
	Married	161	75,60
	Divorced	7	3,30

Table 1 (continued)

Characteristics of Participants

Qualifications	Grade 10 (Std 8) and below	11	5,20
	Grade 12 (Matric) / N3	84	39,40
	Post Matric / 3-year Diploma or Degree	56	26,30
	Post Graduate / Higher Diploma	62	29,10

Table 1 shows that the majority of participants were white (68,10%) married males (64,30%) between the ages of 30 and 39 (39,00%) with a grade 12 (matric) / N3 (39,40%) qualification. Half of the participants were in a supervisory position (50,20%). A total of 48,80% of the participants worked in the chemicals department.

Measuring Battery

Four questionnaires were administered to measure leader empowering behaviour, self-efficacy, job characteristics and work-related flow. A biographical questionnaire was also included to describe the population.

The *Leader Empowering Behaviour Questionnaire* (LEBQ) (Konczak *et al.*, 2000) is a 17-item scale that measures leader empowering behaviour. Items are measured on a 7-point Likert scale ranging from 1 (strongly agree) to 7 (strongly disagree). Thus high scores indicate higher perceptions of empowering leader behaviours. The LEBQ has shown internal consistency ratings ranging from 0,85 to 0,90 (Konczak *et al.*, 2000; Laramore, 1997). Maré (2007) found in a sample of employees in the gold mining industry that the LEBQ can consist either of one factor or six factors. She obtained alpha coefficients ranging from 0,57 to 0,78.

The *General Perceived Self-Efficacy Scale* (GPSES) (Schwarzer & Jerusalem, 1995) was used to measure participants' generalised self-efficacy. The GPSES consists of 10 items. According to Schwarzer and Jerusalem (1995), alpha coefficients of the GPSES vary from 0,75 to 0,90 and it is valid in terms of convergent and discriminant validity. The research of Rothmann and Van

Rensburg (2001) shows a reliability coefficient of 0,80. Kriese (2007) found an alpha coefficient of 0,85 in a sample of employees working in the chemical industry.

The *Job Demands and Resources Scale* (JD-RS) was developed by Le Roux (2005) to measure unique job demands and job resources of employees in the mining industry. This questionnaire was adapted to be relevant for the chemical industry. The items were measured on a four-point scale, ranging from 1 (*never*) to 4 (*always*). Le Roux (2005) found that ten factors could be extracted in the mining industry, explaining 52,25% of the total variance. These factors were labelled supervision, working conditions, workload, task freedom, support, pay and benefits, opportunity for growth, job security, resources availability and working hours. The alpha coefficients she obtained varied from 0,72 to 0,89. The internal consistency and construct validity of the scale were determined in the chemical industry.

Flow at work was assessed with the *Work-related Flow scale* (WOLF; Bakker, 2001). The WOLF includes 13 items measuring absorption (4 items), work enjoyment (4 items) and intrinsic work motivation (5 items). The participants were asked to indicate how often they had each of the experiences during the preceding week (0 = never, 6 = every day). Bakker (2001) found the following reliability results: Absorption (0,80); Work enjoyment (0,90); and Intrinsic Work Motivation (0,75). In a South African study among employees in the mining industry, Le Roux (2005) found the following Cronbach alphas: Absorption (0,59), Work Enjoyment (0,84) and Intrinsic Work Motivation (0,71). In a study among call centre agents, Swart (2006) found that two factors could be extracted explaining 63,92% of the total variance. These factors were labelled Absorption ($\alpha = 0,88$) and Flow (consisting of Work Enjoyment and Intrinsic Work Motivation) ($\alpha = 0,82$).

A *biographical questionnaire* was developed to gather information on the demographic characteristics of the participants. Information gathered included age, gender, race, home language, education, marital status and years employed in current position.

Statistical Analysis

The statistical analysis was conducted with the help of the SPSS Program (SPSS Inc., 2007). Descriptive statistics (e.g. means, standard deviations, skewness and kurtosis) was used to analyse the data. Cronbach alpha coefficients were used to determine the internal consistency, homogeneity and un-dimensionality of the measuring instruments (Clark & Watson, 1995). Coefficient alpha contains important information on the proportion of variance of the items of a scale in terms of the total variance explained by that particular scale.

Pearson product-moment correlation coefficients were used to specify the relationships between the variables. In terms of statistical significance, it was decided to set the value at a 95% confidence interval level ($p \leq 0,05$). Effect sizes (Steyn, 1999) were used to determine the practical significance of the findings. A cut-off point of 0,30 (medium effect) (Cohen, 1988) was set for the practical significance of correlation coefficients.

Multiple regression analyses were conducted to determine the percentage variance in the dependent variables (i.e. work-related flow) that were predicted by the independent variables (i.e. job characteristics, leader empowering behaviour and self-efficacy). The effect size (which indicates practical significance) in the case of multiple regressions is given by the following formula (Steyn, 1999):

$$f^2 = R^2 / 1 - R^2$$

A cut-off point of 0,35 (large effect) (Steyn, 1999) was set for the practical significance.

Multivariate analysis of variance (MANOVA) was used to determine the significance of differences between the levels of work-related flow of demographic groups. MANOVA tests whether or not mean differences among groups in a combination of dependent variables are likely to have occurred by chance (Tabachnick & Fidell, 2001). In MANOVA, a new dependent variable that maximises group differences was created from the set of dependent variables. Wilk's Lambda was used to test the likelihood of the data, on the assumption of equal population

mean vectors for all groups, against the likelihood on the assumption that the population mean vectors are identical to those of the sample mean vectors for the different groups. When an effect was significant in MANOVA, one-way analysis of variance (ANOVA) was used to discover which dependent variables had been affected. As multiple ANOVAs were used, a Bonferroni-type adjustment was made for inflated Type I error. Tukey tests were conducted to indicate which groups differed significantly when ANOVAs were performed.

RESULTS

A principal component factor analysis was performed on the 17 items of the LEBQ on the total sample of employees working in the chemical industry. Analysis of the eigen values (greater than 1) and the scree plot indicated that six factors could be extracted, explaining 84,35% of the total variance. Next, a principle axis factor analysis was followed using a direct oblimin rotation to perform further factor analysis. The factors were labelled: delegation of authority, accountability, self-directed decision making, information sharing, skills development and coaching for innovative performance.

The results of the factor analysis on the LEBQ are indicated in Table 2. The loading of variables on factors, as well as communalities and percentage of variance, is indicated. Variables are ordered and grouped by size of loading to facilitate interpretation. Labels for each factor are suggested in a footnote.

Table 2

Factor Loadings, Communalities (h^2) and Percentage Variance for Principal Factors Extraction and Direct Oblimin Rotation on LEBQ Items

Item	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	h^2
15. My manager is willing to risk mistakes on my part if, over the long term, I will learn and develop as a result of the experience.	0,71	0,00	0,00	0,00	0,00	0,00	0,69
16. I am encouraged to try out new ideas even if there is a chance they may not succeed.	0,67	0,00	0,00	0,00	0,00	0,00	0,63
17. My manager focuses on corrective action rather than placing the blame when I make a mistake.	0,52	0,00	0,00	0,00	0,00	0,00	0,51
5. I am held accountable for performance and results.	0,00	0,95	0,00	0,00	0,00	0,00	0,88
4. My manager holds me accountable for the work I am assigned.	0,00	0,81	0,00	0,00	0,00	0,00	0,73
6. My manager holds people in the department accountable for customer satisfaction	0,00	0,67	0,00	0,00	0,00	0,00	0,52
2. My manager gives me the authority to make changes necessary to improve things.	0,00	0,00	-0,89	0,00	0,00	0,00	0,96
3. My manager delegates authority to me that is equal to the level of responsibility that I am assigned.	0,00	0,00	-0,81	0,00	0,00	0,00	0,82
1. My manager gives me the authority I need to make decisions that improve work processes and procedures.	0,00	0,00	-0,77	0,00	0,00	0,00	0,81
11. My manager provides me with the information I need to meet customers' needs.	0,00	0,00	0,00	-0,95	0,00	0,00	0,95
10. My manager shares information that I need to ensure high quality results.	0,00	0,00	0,00	-0,84	0,00	0,00	0,87
9. My manager encourages me to develop my own solutions to problems I encounter in my work.	0,00	0,00	0,00	0,00	0,93	0,00	0,92
8. My manager relies on me to make my own decisions about issues that affect how work gets done.	0,00	0,00	0,00	0,00	0,66	0,00	0,75
7. My manager tries to help me arrive at my own solutions when problems arise, rather than telling me what he/she would do.	0,00	0,00	0,00	0,00	0,57	0,00	0,62
13. My manager provides me with frequent opportunities to develop new skills.	0,00	0,00	0,00	0,00	0,00	-0,83	0,92
14. My manager ensures that continuous learning and skill development are priorities in our department.	0,00	0,00	0,00	0,00	0,00	-0,69	0,87
12. My manager encourages me to use systematic problem-solving methods (e.g., the seven-step problem-solving model).	0,00	0,00	0,00	0,00	0,00	-0,35	0,56
Percentage of Variance	52,18	12,12	7,49	4,95	4,23	3,38	

F₁ Coaching for Innovative Performance; F₂ Accountability; F₃ Delegation of Authority; F₄ Information Sharing; F₅ Self-Directed Decision Making; F₆ Skills Development.

The first factor, labelled *Coaching for Innovative Performance*, has items loading on it that relate to coaching in the work environment. It involved mainly the manager's willingness to risk mistakes for the purpose of learning; encouragement to try out new ideas; and focusing on corrective actions rather than apportioning blame for mistakes. The second factor was labelled *Accountability* and included aspects such as accountability for performance, results and customer satisfaction. *Delegation of Authority* as the third factor included perceptions on authority given to take decisions and to make changes where needed to improve things. The fourth factor was labelled *Information Sharing* and included factors such as providing information needed to meet customer's needs and information needed to ensure high quality results. The items that loaded on the fifth factor – labelled *Self-Directed Decision Making* – included aspects such as management encouraging employees to develop their own solutions to problems; management relying on employee decisions about how work gets done; and management assisting employees to arrive at their own solutions. The sixth factor was labelled *Skills Development*. The items that loaded on this factor included aspects such as providing frequent opportunities to develop new skills; ensuring continuous learning and skills development as priorities; and encouragement to use systematic problem-solving methods.

A second-order factor analysis was performed on the six factors of the LEBQ. One factor was extracted, explaining 63,17% of the total variance. It was labelled *leader empowering behaviour*.

A principal component factor analysis was performed on the 10 items of the GPSES on the total sample of employees working in the chemical industry. Analysis of the eigen values (greater than 1) and the scree plot indicated that one factor could be extracted, explaining 45,89% of the total variance. This factor was labelled *self-efficacy*.

A principal component factor analysis was performed on the 77 items of the JDRS on the total sample of employees working in the chemical industry. Analysis of the eigen values (greater than 1) and the scree plot indicated that eight factors could be extracted, explaining 49,50% of the total variance. Next, a principle axis factor analysis was followed using a direct oblimin rotation to perform further factor analysis.

The results of the factor analysis on the JDRS are indicated in Table 3. The loading of variables on factors, as well as communalities and percentage of variance, is indicated. Variables are ordered and grouped by size of loading to facilitate interpretation. Labels for each factor are suggested in a footnote.

Table 3

Factor Loadings, Communalities (h^2) and Percentage Variance for Principal Factors Extraction and Direct Oblimin Rotation on JDRS Items

Item	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	F ₇	F ₈	h^2
28. Can you discuss work problems with your direct supervisor?	0,79	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,59
29. Can you count on your supervisor when you come across difficulties in your work?	0,73	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,62
23. Do you know exactly what your direct supervisor thinks of your performance?	0,72	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,57
26. Does your direct supervisor inform you about how well you are doing your work?	0,69	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,57
21. Do you get on well with your supervisor or manager?	0,62	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,47
22. In your work, do you feel appreciated by your supervisor / manager?	0,60	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,50
25. Do you receive sufficient information on the results of your work?	0,59	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,48
30. Are you and your colleagues treated fairly?	0,51	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,49
24. Do you have autonomy to do your work as you prefer?	0,43	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,37
27. Are you kept up-to-date about important issues within the mining industry affecting your job?	0,42	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,32
19. Do you find it difficult to complete all your tasks for the day?	0,00	0,72	0,00	0,00	0,00	0,00	0,00	0,00	0,58
16. Do you have too much work to do?	0,00	0,66	0,00	0,00	0,00	0,00	0,00	0,00	0,51
15. Is your job hectic?	0,00	0,66	0,00	0,00	0,00	0,00	0,00	0,00	0,49
17. Do you have work left when you leave work?	0,00	0,64	0,00	0,00	0,00	0,00	0,00	0,00	0,48
18. Are you asked to do an excessive amount of work?	0,00	0,61	0,00	0,00	0,00	0,00	0,00	0,00	0,53
11. Do you have to work very hard?	0,00	0,59	0,00	0,00	0,00	0,00	0,00	0,00	0,38
10. Do you have to work under time pressure?	0,00	0,51	0,00	0,00	0,00	0,00	0,00	0,00	0,31
14. Are your tasks often interrupted before they can be completed?	0,00	0,47	0,00	0,00	0,00	0,00	0,00	0,00	0,37
12. Do you have enough time to get the job done?	0,00	0,44	0,00	0,00	0,00	0,00	0,00	0,00	0,34
55. Do you have a stressful working environment	0,00	0,43	0,00	0,00	0,00	0,00	0,00	0,00	0,44
13. Does your job require long periods of intense concentration on the task?	0,00	0,40	0,00	0,00	0,00	0,00	0,00	0,00	0,23
20. Do you have to meet targets that seem impossible/unrealistic?	0,00	0,38	0,00	0,00	0,00	0,00	0,00	0,00	0,34
63. Does your work make sufficient demands on all your skills and capacities?	0,00	0,30	0,00	0,00	0,00	0,00	0,00	0,00	0,33
33. Do you need to be more secure that you will keep your current job in the next year?	0,00	0,00	0,97	0,00	0,00	0,00	0,00	0,00	0,90
32. Do you need to be more secure that you will still be working in one year's time?	0,00	0,00	0,92	0,00	0,00	0,00	0,00	0,00	0,81

Table 3 (continued)

Factor Loadings, Communalities (h^2), and Percentage Variance for Principal Factors Extraction and Direct Oblimin Rotation on JDRS Items

Item	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	F ₇	F ₈	h^2
34. Do you need to be more secure that you will keep the same function level as currently?	0,00	0,00	0,82	0,00	0,00	0,00	0,00	0,00	0,64
2. Is material (i.e. equipment) available when you need it?	0,00	0,00	0,00	0,83	0,00	0,00	0,00	0,00	0,75
5. Do you have access to resources (i.e. material/equipment/labour) when you need it?	0,00	0,00	0,00	0,77	0,00	0,00	0,00	0,00	0,65
3. Do you have the right resources (i.e. material/equipment/labour) available to complete your daily tasks?	0,00	0,00	0,00	0,77	0,00	0,00	0,00	0,00	0,65
4. Is material issued on time?	0,00	0,00	0,00	0,75	0,00	0,00	0,00	0,00	0,57
1. Do you have adequate resources (i.e. material/equipment/labour) to complete your daily tasks?	0,00	0,00	0,00	0,68	0,00	0,00	0,00	0,00	0,56
8. Is there sufficient personnel /labour to handle the workload?	0,00	0,00	0,00	0,55	0,00	0,00	0,00	0,00	0,54
9. Is there enough staff/labour to do the work?	0,00	0,00	0,00	0,52	0,00	0,00	0,00	0,00	0,47
60. Do you receive the right technical support to complete your tasks?	0,00	0,00	0,00	0,49	0,00	0,00	0,00	0,00	0,51
59. Do you receive sufficient technical support to complete your tasks?	0,00	0,00	0,00	0,48	0,00	0,00	0,00	0,00	0,52
71. Do you have any influence over decisions about when a piece of work must be completed?	0,00	0,00	0,00	0,00	-0,72	0,00	0,00	0,00	0,59
72. Can you decide for yourself how much time you would like to spend on a certain task?	0,00	0,00	0,00	0,00	-0,71	0,00	0,00	0,00	0,50
70. Can you decide for yourself how to carry out your work?	0,00	0,00	0,00	0,00	-0,70	0,00	0,00	0,00	0,55
75. Do you have influence in the planning of your work activities?	0,00	0,00	0,00	0,00	-0,67	0,00	0,00	0,00	0,51
73. Do you solve problems that arise in your work yourself?	0,00	0,00	0,00	0,00	-0,58	0,00	0,00	0,00	0,38
74. Can you determine the content of your work yourself?	0,00	0,00	0,00	0,00	-0,50	0,00	0,00	0,00	0,34
69. Do you have freedom in carrying out your work activities?	0,00	0,00	0,00	0,00	-0,49	0,00	0,00	0,00	0,46
68. Does your job offer you the possibility of independent thought and action?	0,00	0,00	0,00	0,00	-0,45	0,00	0,00	0,00	0,51
76. Does your organisation give you opportunities to follow training courses?	0,00	0,00	0,00	0,00	-0,35	0,00	0,00	0,00	0,35
53. Do you work in dangerous conditions?	0,00	0,00	0,00	0,00	0,00	0,65	0,00	0,00	0,44
44. Are you exposed to health risks in your work environment?	0,00	0,00	0,00	0,00	0,00	0,55	0,00	0,00	0,38
54. Do you work in unsafe conditions?	0,00	0,00	0,00	0,00	0,00	0,53	0,00	0,00	0,33
47. Do you have to make critical, on-the-spot decisions?	0,00	0,00	0,00	0,00	0,00	0,47	0,00	0,00	0,48
45. Are there security risks posed in the area where your job is located?	0,00	0,00	0,00	0,00	0,00	0,41	0,00	0,00	0,33
46. Do you have to deal with crisis situations?	0,00	0,00	0,00	0,00	0,00	0,41	0,00	0,00	0,45
43. Are uncontrollable events in your work environment affecting your work performance?	0,00	0,00	0,00	0,00	0,00	0,40	0,00	0,00	0,46
50. Do you have to adhere to certain standards and regulations (i.e. legal aspects, code of conduct, statutory regulations, etc.)?	0,00	0,00	0,00	0,00	0,00	0,37	0,00	0,00	0,27
58. Do your co-workers help you to get the job done?	0,00	0,00	0,00	0,00	0,00	0,34	0,00	0,00	0,31
56. Can you count on your co-workers when you come across difficulties in your work?	0,00	0,00	0,00	0,00	0,00	0,32	0,00	0,00	0,35

Table 3 (continued)

Factor Loadings, Communalities (h^2) and Percentage Variance for Principal Factors Extraction and Direct Oblimin Rotation on JDRS Items

Item	F ₁	F ₂	F ₃	F ₄	F ₅	F ₆	F ₇	F ₈	h^2
48. Do you experience conflict with other departments/divisions?	0,00	0,00	0,00	0,00	0,00	0,32	0,00	0,00	0,36
57. If necessary, can you ask your co-workers for help?	0,00	0,00	0,00	0,00	0,00	0,36	0,00	0,00	0,42
66. Does your job offer you opportunities for personal growth and development?	0,00	0,00	0,00	0,00	0,00	0,00	0,60	0,00	0,67
67. Does your job give you the feeling that you can achieve something?	0,00	0,00	0,00	0,00	0,00	0,00	0,55	0,00	0,70
37. Does your job offer you the possibility to progress financially?	0,00	0,00	0,00	0,00	0,00	0,00	0,52	0,00	0,55
41. Do you have to work irregular hours?	0,00	0,00	0,00	0,00	0,00	0,00	0,49	0,00	0,44
77. Does your job give you the opportunity to be promoted?	0,00	0,00	0,00	0,00	0,00	0,00	0,46	0,00	0,34
52. Do you experience a lot of improvement in the area where your job is located?	0,00	0,00	0,00	0,00	0,00	0,00	0,42	0,00	0,33
42. Do you have to work overtime?	0,00	0,00	0,00	0,00	0,00	0,00	0,40	0,00	0,41
40. Do you have to work socially undesirable hours?	0,00	0,00	0,00	0,00	0,00	0,00	0,38	0,00	0,38
65. Do you have enough variety in your work?	0,00	0,00	0,00	0,00	0,00	0,00	0,35	0,00	0,40
38. Can you live comfortably on your pay?	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,58	0,46
36. Do you think you are paid enough for the work that you do?	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,56	0,50
39. Do you think your organisation provides good benefits?	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,51	0,41
35. Do you think your organisation pays good salaries?	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,46	0,40
Percentage of variance	16,67	9,76	5,32	4,80	3,64	3,26	3,11	2,93	

F₁ Supervision; F₂ Demand and Overload; F₃ Job Security; F₄ Resources Availability; F₅ Autonomy; F₆ Working Conditions and Support; F₇ Task Characteristics; F₈ Pay and Benefits.

Eight internally consistent factors were extracted, explaining 49,50% of the total variance. Eight of the 77 variables did not load on any of the factors.

The first factor was labelled *Supervision*. Items loading on this factor relate to supervision in the work environment. It involved mainly the receiving of sufficient information on work results; purpose of work and work performance; clear expectations from superiors; and relationship with immediate supervisor. The second factor was labelled *Demand and Overload*. The items that loaded on this factor include aspects such as working under time pressure; working very hard; the requirement of long periods of intense concentration on tasks; too much work to do; required to do an excessive amount of work; difficulty in completion of all tasks for the day; and having to meet targets that seem impossible or unrealistic. The third factor was labelled *Job Security* and

reflected participants' indication that they would still be working in one year's time and would keep the current level of functioning; and that they need to be more secure in keeping their current job in the next year.

The fourth factor was labelled *Resources Availability*. The items that loaded on this factor included aspects such as the availability of adequate resources; material (i.e. equipment) available when needed; the availability of the right resources (i.e. material/equipment/labour) to complete daily tasks; receiving tasks and/or assignments without adequate resources (i.e. material/equipment/labour) to execute them; and sufficient personnel or labour to handle the workload. The fifth factor was labelled *Autonomy* and included factors that measured knowledge of own responsibilities; the freedom to carry out work activities; the freedom to decide how to carry out work; responsibility for problem solving in work; determining the content of work; and influence in the planning of work activities. The sixth factor was labelled *Working Conditions and Support* and included factors that affected the working conditions, such as uncontrollable events in the working environment; health and security risks; crisis and conflict situations; communication barriers with co-workers; dangerous, unsafe working conditions; and stressful working conditions. Other items loading on this factor included aspects such as relying on colleagues when facing difficulties at work; asking colleagues for help; and getting on well with colleagues.

The seventh factor was labelled *Task Characteristics* and included aspects such as the variety in the work; opportunities for personal growth and development; feelings of achievement; having to work socially undesirable and irregular hours; and working overtime. The eighth factor was labelled *Pay and Benefits* and included perceptions on the pay and benefits received.

A second-order factor analysis was performed on the eight factors of the JDRS. Two factors were extracted, explaining 51,67% of the total variance. These two factors were labelled *Job Resources* (consisting of Supervision, Task Characteristics, Autonomy, Pay and Benefits and Resources Availability) and *Job Demands* (consisting of Working Conditions and Support, and Demand and Overload). Job Security did not load on any of the factors.

A principal component factor analysis was performed on the 13 items of the WOLF on the total sample of employees working in the chemical industry. Analysis of the eigen values (greater than 1) and the scree plot indicated that one factor could be extracted, explaining 54,85% of the total variance. This factor was labelled *Work-related Flow*.

The descriptive statistics and alpha coefficients of the six factors of the LEBQ, one factor of the GPSES, eight factors of the JDRS and one factor of the WOLF are indicated in Table 4.

Table 4

Descriptive statistics and Alpha coefficients of the LEBQ, GPSES, JDRS and WOLF

Item	Mean	SD	Skewness	Kurtosis	α
LEBQ					
Delegation of Authority	15,35	5,45	-0,72	-0,67	0,95
Accountability	18,00	4,06	-1,53	1,65	0,84
Self-directed decision making	16,02	4,95	-0,83	-0,27	0,88
Information sharing	10,25	3,67	-0,69	-0,64	0,95
Skills Development	13,08	5,86	-0,10	-1,33	0,89
Coaching for innovative improvement	13,44	5,12	-0,23	-0,89	0,81
GPSES					
Self-efficacy	34,29	4,17	-0,63	0,16	0,86
JDRS					
Supervision	29,14	6,33	-0,41	-0,28	0,89
Demand and Overload	33,39	6,81	0,24	-0,53	0,86
Job Security	6,06	2,86	0,60	-0,74	0,91
Resources Availability	26,55	5,33	-0,31	-0,21	0,90
Autonomy	26,97	5,06	-0,24	-0,21	0,85
Working conditions and support	28,62	5,66	0,28	-0,26	0,75
Task Characteristics	21,16	5,03	0,24	-0,30	0,79
Pay and Benefits	9,55	3,00	0,16	-0,82	0,82
WOLF					
Work-related flow	56,24	17,83	-0,09	-0,77	0,93

Table 4 indicates that acceptable Cronbach alpha coefficients varying from 0,75 to 0,95 were obtained. These alpha coefficients compare reasonably well with the guideline of 0,70 (0,55 in basic research), demonstrating that a large proportion of the variance is explained by the dimensions (internal consistency of the dimensions) (Nunnally & Bernstein, 1994). It is evident from Table 4 that most of the scales of the measuring instruments have relatively normal distributions with low skewness and kurtosis, except for accountability and skills development.

The product-moment correlation coefficients between leader empowering behaviour, self-efficacy, job characteristics and work-related flow are provided in Table 5.

Table 5

Product-moment correlation coefficients between the LEBQ, GPSES, JDRS and WOLF

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Delegation of Authority	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2. Accountability	0,39 ⁺	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3. Self-directed decision making	0,72 ^{***}	0,40 ⁺⁺	.	.	.	.	.	.	.	.	.	.	.	.	.
4. Information sharing	0,59 ^{***}	0,29 [*]	0,68 ^{***}	.	.	.	.	.	.	.	.	.	.	.	.
5. Skills Development	0,60 ^{***}	0,30 [*]	0,66 ^{***}	0,73 ^{***}	.	.	.	.	.	.	.	.	.	.	.
6. Coaching for innovative performance	0,54 ^{***}	0,26 [*]	0,65 ^{***}	0,62 ^{***}	0,72 ^{***}	.	.	.	.	.	.	.	.	.	.
7. Self-efficacy	0,30 [*]	0,25 [*]	0,29 [*]	0,12	0,29 [*]	0,27 [*]	.	.	.	.	.	.	.	.	.
8. Supervision	0,49 ⁺	0,16 [*]	0,59 ^{***}	0,67 ^{***}	0,64 ^{***}	0,61 ^{***}	0,17 [*]	.	.	.	.	.	.	.	.
9. Demand and Overload	0,16 [*]	-0,05	-0,19 [*]	-0,31 ⁺⁺	-0,30 [*]	-0,23 [*]	-0,04	-0,28 [*]	.	.	.	.	.	.	.
10. Job Security	-0,01	0,05	0,03	-0,02	0,04	0,00	-0,01	-0,06	-0,01	.	.	.	.	.	.
11. Resources Availability	0,30 [*]	0,23 [*]	0,31 ⁺⁺	0,36 ⁺⁺	0,40 ⁺⁺	0,34 ⁺⁺	0,22 [*]	0,38 ⁺⁺	-0,36 ⁺⁺	0,02	.	.	.	.	.
12. Autonomy	0,51 ^{***}	0,16 [*]	0,50 ⁺⁺	0,33 ⁺⁺	0,42 ⁺⁺	0,41 ⁺⁺	0,28 [*]	0,43 ⁺⁺	0,02	-0,03	0,26 [*]	.	.	.	.
13. Working conditions and support	0,07	0,17 [*]	-0,00	-0,12	-0,01	-0,04	0,18 [*]	-0,09	0,29 [*]	0,17 [*]	-0,20 [*]	0,10	.	.	.
14. Task Characteristics	0,31 ⁺⁺	0,10	0,35 ⁺⁺	0,26 [*]	0,33 ⁺⁺	0,34 ⁺⁺	0,15	0,33 ⁺⁺	0,20 [*]	0,01	0,15 [*]	0,51 ^{***}	0,23 [*]	.	.
15. Pay and Benefits	0,23 [*]	0,07	0,27 [*]	0,27 [*]	0,29 [*]	0,29 [*]	0,09	0,36 ⁺⁺	-0,07	-0,04	0,38 ⁺⁺	0,37 ⁺⁺	-0,11	0,33 ⁺⁺	.
16. Work-related Flow	0,54 ^{***}	0,22 [*]	0,51 ^{***}	0,47 ⁺⁺	0,52 ^{***}	0,43 ⁺⁺	0,36 ⁺⁺	0,44 ⁺⁺	-0,03	0,12	0,31 [*]	0,49 ⁺⁺	0,10	0,41 ⁺⁺	0,26 [*]

$p \leq 0,05$ – statistically significant

+ $r > 0,30$ – practically significant (medium effect)

++ $r > 0,50$ – practically significant (large effect)

Table 5 shows statistically significant positive correlations (practically significant, large effect) between delegation of authority and self-directed decision making, information sharing, skills development, coaching for innovative performance, autonomy and work-related flow. There is also a statistically significant positive correlation (practically significant, medium effect) between delegation of authority and accountability, and task characteristics. There is a statistically significant positive correlation (practically significant, medium effect) between accountability and self-directed decision making.

There are statistically significant positive correlations (practically significant, large effect) between self-directed decision making and information sharing, skills development, coaching for innovative performance, supervision and work-related flow. There are also statistically significant correlations (practical significant, medium effect) between self-directed decision making and resources availability, autonomy and task characteristics. There are statistically significant positive correlations (practically significant, large effect) between information sharing and skills development, coaching for innovative performance and supervision. There are also statistically significant positive correlations (practically significant, medium effect) between information sharing and resources availability, autonomy and work-related flow; and a statistically significant negative correlation (practically significant, medium effect) between information sharing and demand and overload.

Skills development had statistically significant positive correlations (practically significant, large effect) with coaching for innovative performance, supervision and work-related flow; and statistically significant positive correlations (practically significant, medium effect) with resources availability, autonomy and task characteristics. Coaching for innovative performance had a statistically significant positive correlation (practically significant, large effect) with supervision and statistically significant positive correlations (practically significant, medium effect) with resources availability, autonomy, task characteristics and work-related flow.

Self-efficacy had a statistically significant positive correlation (practical significant, medium effect) with work-related flow. There are statistically significant positive correlations (practical significant, medium effect) between supervision and resources availability, autonomy, task

characteristics, pay and benefits and work-related flow. Demand and overload had a statistically significant negative correlation (practical significant, medium effect) with resources availability. Resources availability had statistically significant positive correlations (practical significant, medium effect) with pay and benefits and work-related flow. Autonomy had a statistically significant positive correlation (practical significant, large effect) with task characteristics and statistically significant positive correlations (practical significant, medium effect) with pay and benefits and work-related flow. Task characteristics had significantly positive correlations (practical significant, medium effect) with pay and benefits and work-related flow.

From the above it seems that leader empowering behaviour (i.e. delegation of authority; self-directed decision making; information sharing; and coaching for innovative performance), self-efficacy and the availability of job resources (i.e. supervision; resources availability; and autonomy) can result in higher levels of work-related flow.

The results of a multiple regression analysis with work-related flow as dependent variable and leader empowering behaviour (delegation of authority; accountability; self-directed decision making; information sharing; skills development; coaching for innovative performance), self-efficacy and job characteristics (supervision; demand and overload; job security; resources availability; autonomy; working conditions and support; task characteristics; pay and benefits) as independent variables are reported in Table 6.

Table 6

Multiple regression analyses with work-related flow as dependent variable

	Model	Unstandardised Coefficients		Standardised Coefficients Beta	<i>T</i>	<i>p</i>	<i>F</i>	<i>R</i>	<i>R</i> ²	ΔR^2
		<i>B</i>	<i>SE</i>							
1	(Constant)	-28,43	10,92		-2,60	0,01*	14,96*	0,61	0,37	0,37
	Supervision	0,72	0,19	0,26	3,71	0,00*				
	Demand and Overload	0,15	0,17	0,06	0,86	0,39				
	Job security	0,83	0,35	0,13	2,35	0,02*				
	Resources availability	0,52	0,22	0,16	2,34	0,02*				
	Autonomy	1,00	0,25	0,28	4,06	0,00*				
	Working conditions and support	0,14	0,19	0,05	0,74	0,46				
	Task characteristics	0,49	0,25	0,14	1,97	0,05				
	Pay and benefits	-0,17	0,39	-0,03	-0,43	0,67				
2	(Constant)	-20,45	10,78		-1,90	0,06	11,66*	0,67	0,45	0,08
	Supervision	0,18	0,23	0,06	0,77	0,44				
	Demand and Overload	0,30	0,17	0,11	1,80	0,07				
	Job security	0,76	0,34	0,12	2,24	0,03*				
	Resources availability	0,39	0,22	0,12	1,78	0,08				
	Autonomy	0,62	0,25	0,18	2,46	0,02*				
	Working conditions and support	0,09	0,19	0,03	0,46	0,65				
	Task characteristics	0,37	0,24	0,11	1,55	0,12				
	Pay and benefits	-0,08	0,37	-0,01	-0,21	0,84				
	Delegation of authority	0,72	0,27	0,22	2,65	0,01*				
	Accountability	-0,15	0,27	-0,03	-0,56	0,58				
	Self-directed decision making	0,17	0,34	0,05	0,52	0,61				
	Information sharing	0,48	0,44	0,10	1,09	0,28				
	Skills development	0,52	0,29	0,17	1,80	0,07				
	Coaching for innovative performance	-0,18	0,29	-0,05	-0,63	0,53				
3	(Constant)	-38,24	12,01		-3,19	0,00*	12,00*	0,69	0,48	0,03
	Supervision	0,19	0,22	0,07	0,84	0,40				
	Demand and Overload	0,30	0,16	0,11	1,82	0,07				
	Job security	0,83	0,33	0,13	2,50	0,01*				
	Resources availability	0,29	0,22	0,09	1,35	0,18				
	Autonomy	0,54	0,25	0,15	2,17	0,03*				
	Working conditions and support	-0,01	0,19	-0,00	-0,05	0,96				
	Task characteristics	0,41	0,24	0,12	1,76	0,08				
	Pay and benefits	-0,03	0,36	-0,00	-0,07	0,94				
	Delegation of authority	0,68	0,26	0,21	2,56	0,01*				
	Accountability	-0,23	0,26	-0,05	-0,87	0,39				
	Self-directed decision making	0,10	0,33	0,03	0,29	0,77				
	Information sharing	0,72	0,44	0,15	1,65	0,10				
	Skills development	0,41	0,28	0,13	1,44	0,15				
	Coaching for innovative performance	-0,25	0,28	-0,07	-0,88	0,38				
	Self-efficacy	0,77	0,25	0,18	3,11	0,00*				

p < 0,05

Table 6 shows that 37 percent of the variance explained in work-related flow was predicted by job characteristics ($F = 14,96, p < 0,05$). The only significant predictors of work-related flow were supervision, job security, resources availability and autonomy. When leader empowering behaviour was added into the multiple regression analysis, the statistical significance of R^2 increased ($\Delta R^2 = 0,08$). Table 6 shows that 45 percent of the variance explained in work-related flow was predicted by job characteristics and leader empowering behaviour ($F = 11,66, p < 0,05$). The only significant predictors of work-related flow were job security, autonomy and delegation of authority. When self-efficacy was added into the multiple regression analysis, the statistical significance of R^2 increased ($\Delta R^2 = 0,03$). Table 6 shows that 48 percent of the variance explained in work-related flow was predicted by job characteristics, leader empowering behaviour and self-efficacy ($F = 12,00, p < 0,05$). The only significant predictors of work-related flow were job security, autonomy, delegation of authority and self-efficacy. It therefore appears that when employees experience higher levels of job security, autonomy, delegation of authority and self-efficacy, they will also experience higher levels of work-related flow.

ANOVA analyses were used to determine the relationship between work-related flow and different demographic characteristics. The results of the comparisons are given in Tables 7 to 8.

Table 7

Differences in work-related flow based on job levels

Item	Level 3	Level 4	Level 5A	Level 5B	Level 6C	Level 6	Level 7	Level 8	Level 9	Level 10	P	Partial Squared	Eta
Work-related Flow	64,50 ^a	54,92	56,37	63,57	48,84	54,84	58,87	43,87 ^b	55,20	63,57	0,046 [*]	0,08	

Statistically significant difference $p < 0,05$

^a Group differs statistically significantly from coping strategy (in row) where ^b is indicated

Table 7 shows that employees in a managerial position (level 3) experienced higher levels of work-related flow in comparison to employees at a level 8.

Table 8

Differences in work-related flow based on sector

Item	Chemicals	Petroleum	Fertiliser	Explosives	<i>P</i>	Partial Eta Squared
Work-related flow	52,13	50,17 ^b	63,08 ^a	60,10	0,00*	0,07

Statistically significant difference $p < 0,05$ ^a Group differs statistically significantly from coping strategy (in row) where ^b is indicated

Table 8 shows that employees working in the fertiliser environment experienced higher levels of work-related flow compared to employees working in the petroleum environment.

No statistical differences were found between the experiences of work-related flow and demographic groups such as gender, qualification levels, age groups, racial groups, language groups and years' experience in selected sectors in the chemical industry.

DISCUSSION

The objective of this study was to determine the relationship between leader empowering behaviour, self-efficacy, job characteristics and work-related flow of employees in selected sectors in the chemical industry. More specifically, it was investigated whether personal and organisational resources facilitated flow at work, and whether employees who experienced flow mobilised more resources over time.

The first objective of this study was to conceptualise leader empowering behaviour, self-efficacy, job characteristics and work-related flow in a sample of the chemical industry. A principal component factor analysis was performed on the 17 items of the LEBQ on the total sample of employees working in the chemical industry. Six factors could be extracted, explaining 84,35% of the total variance, labelled *Coaching for Innovative Performance*, *Accountability*, *Delegation of Authority*, *Information Sharing*, *Self-Directed Decision Making*, and *Skills Development*. A second-order factor analysis was performed on the six factors of the LEBQ. One factor, labelled *Leader Empowering Behaviour*, was extracted, explaining 63,17% of the total variance.

A principal component factor analysis was performed on the 10 items of the GPSES on the total sample of employees working in the chemical industry. Analysis of the eigen values (greater than 1) and the scree plot indicated that one factor could be extracted, explaining 45,89% of the total variance. This factor was labelled *Self-Efficacy*.

A principal component factor analysis was performed on the 77 items of the JDRS on the total sample of employees working in the chemical industry. Analysis of the eigen values (greater than 1) and the scree plot indicated that eight factors could be extracted, explaining 49,50% of the total variance. These factors were *Supervision, Demand and Overload, Job Security, Resources Availability, Autonomy, Working Conditions and Support, Task Characteristics and Pay and Benefits*. Eight of the 77 variables did not load on any of the factors.

A principal component factor analysis was performed on the 13 items of the WOLF on the total sample of employees working in the chemical industry. Analysis of the eigen values (greater than 1) and the scree plot indicated that one factor could be extracted, explaining 54,85% of the total variance. This factor was labelled work-related flow.

Acceptable Cronbach alpha coefficients varying from 0,75 to 0,95 were obtained. These alpha coefficients compare reasonably well with the guideline of 0,70 (0,55 in basic research), demonstrating that a large proportion of the variance is explained by the dimensions (internal consistency of the dimensions) (Nunnally & Bernstein, 1994). Most of the scales of the measuring instruments have relatively normal distributions, with low skewness and kurtosis, except for accountability and skills development.

Next, Pearson product-moment correlation coefficients were used to specify the relationships between leader empowering behaviour, self-efficacy, job characteristics, and work-related flow. The results indicated that the factors of Leader Empowering Behaviour correlated positively with work-related flow. This suggests that the behaviour of management in selected sectors of the chemical industry can have a direct effect on the ability of their workers to experience work-related flow, with resultant business benefits that include increased productivity, lower absenteeism and improved staff retention. This bears out the findings of the literature that leader

empowering behaviour creates a mutually beneficial situation, as customers benefit from engaged employees; organisations benefit from satisfied customers and engaged employees; and employees benefit from improved confidence and self-esteem (Vogt & Murrell, 1990).

Self-efficacy had a significant positive correlation with work-related flow. This suggests that the ability of employees to perform at an optimum level is an important predictor of flow within an organisation. This is an important finding, as high levels of self-efficacy can mobilise workers to perform more effectively in the workplace (Bandura 1997, 2001) and can buffer the negative impact of job demands on burnout (Salanova *et al.*, 2000; Salanova *et al.*, 2003).

Another significant positive correlation was found between resources availability and work-related flow. This bears out the findings of previous research by Bakker, Demerouti and Verbeke (2004), and in South Africa by Le Roux (2005) and Swart (2006), that indicated reciprocal relationships between resources and work-related flow.

The research shows that the only significant predictors of work-related flow were supervision, job security, resources availability and autonomy. When leader empowering behaviour was added into the multiple regression analysis, 45 percent of the variance explained in work-related flow was predicted by job characteristics and leader empowering behaviour. Here the only significant predictors of work-related flow were job security, autonomy and delegation of authority. When self-efficacy was added into the multiple regression analysis, 48 percent of the variance explained in work-related flow was predicted by job characteristics, leader empowering behaviour and self-efficacy. In this case, the only significant predictors of work-related flow were job security, autonomy, delegation of authority and self-efficacy. It therefore appears that when employees experience higher levels of job security, autonomy, delegation of authority and self-efficacy, that they will also experience higher levels of work-related flow.

It also seems that employees working in the fertiliser environment experience statistically significant higher levels of work-related flow in comparison to employees working in the petroleum environment. However, it is possible that the findings in this research could be

attributed to circumstances that are specific to the organisations under investigation. Further research would be necessary to establish this.

Finally, results in this research indicated no statistical differences in the experiences of work-related flow in different demographic groups such as gender, qualification levels, age groups, racial groups, language groups and years' experience in the chemical industry.

Based on the results, hypotheses 1 and 2 were accepted.

RECOMMENDATIONS

The demand for ever higher levels of employee performance will be the most critical factor in achieving responsiveness, innovation, speed, flexibility and cost-effectiveness in the modern organisation (Veldsman, 2003). Apart from focusing on achievement of higher levels of performance, there also needs to be a focus on eliminating aspects that may negatively affect employee engagement.

It is important to assist the chemical industry in maximising performance through critically examining leader empowering behaviour, self-efficacy, job characteristics (i.e. job demands and job resources) and work-related flow characteristics (i.e. absorption, intrinsic motivation, and work enjoyment) in the environment. Research conducted by Demerouti *et al.* (2000), shows that job demands and job resources are role players within the accumulation of burnout and engagement. Bakker (2004) found that when individuals are able to balance their job demands and job resources they will be more open to positive experiences (such as flow) in the work situation, which may result in better performance by that individual.

The availability of job resources, leader empowering behaviour and self-efficacy were found to positively affect levels of work-related flow. It is therefore recommended that organisations, and specifically the chemical industry, consider these three constructs when trying to achieve higher levels of performance. More research should also be done to determine constructs that negatively impact on work-related flow in the chemical industry.

Limitations of this study include the use of a cross-sectional survey design. More valid results might have been provided by using longitudinal research. A further limitation is the fact that the results were solely obtained by self-report measures. This may lead to a problem known as “method variance” or “nuisance” (Dollard & Winefield, 1998). Although the respondents spoke several different languages, the questionnaire was available only in English. Respondents’ level of English language skills could have influenced the results.

It is also possible that certain relevant job characteristics relevant to the chemical industry were not included in the job demands and resources scale. The factor structure of the JDRS should therefore be investigated in other organisations within the chemical industry. Similar studies need to be undertaken for other samples from the chemical industry and future longitudinal research should be conducted to identify the causal nature of – and determine the relationship between – variables, and to ascertain which variables could enhance work-related flow. Larger sample sizes would allow for testing of construct equivalence and item bias in multicultural samples. The inclusion of personality dimensions is recommended to establish the effects of personality differences on work-related flow experienced in the chemical industry.

REFERENCES

- Antonovsky, A. (1984). A call for a new question – salutogenesis and a proposed answer to the sense of coherence. *Journal of Preventative Psychiatry*, 22(1), 1-11.
- Arvidsson, I., Akesson, I. & Hansson, G. (2003). Wrist movements among females in a retentive, non-forceful work. *Applied Ergonomics*, 34(4), 309.
- Bakker, A. B. (2001). *Questionnaire for the assessment of work-related flow: The WOLF*. Utrecht University, The Netherlands: Department of Social and Organizational Psychology.
- Bakker, A. B. (2004). *Development and validation of the Work-Related Flow inventory (WOLF)*. Utrecht University, Department of Social and Organizational Psychology, and Research Institute Psychology and Health, Utrecht, The Netherlands.
- Bakker, A. B. (2005). Flow among music teachers and their students: The crossover of peak experiences. *Journal of Vocational Behaviour*, 66, 26-44.
- Bakker, A. B., Demerouti, E., De Boer, E. & Schaufeli, W. B. (2001). Job demands and job resources as predictors of absence duration and frequency. *Journal of Vocational Behavior*, 62, 341-356.
- Bakker, A.B., Demerouti, E., Taris, T.W., Schaufeli, W.B. & Schreurs, P.J.G. (2002). A multi-group analysis of the Job Demands-Resources model in four home-care organizations. *International Journal of Stress Management*, 10, 16-38.
- Bakker, A. B., Demerouti, E. & Schaufeli, W. B. (2003). Dual processes at work in a call centre: An application of the job demands-resources model. *European Journal of Work and Organizational Psychology*, 12(4), 393-417.
- Bakker, A. B., Demerouti, E. & Verbeke, W. (2004). Using the job demands-resources model to predict burnout and performance. *Human Resource Management*, 43(1), 83-104, Spring.
- Bakker, A. B. & Geurts, S. A. E. (2004). Towards a dual-process model of work-home interference. *Work and Occupations*, 31, 345-366.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioural change. *Psychological Review*, 84(2), 191-215.
- Bandura, A. (1982). Self-efficacy mechanisms in human agency. *American Psychologist*, 37, 122-147.

- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bandura, A. (1999). Social cognitive theory of personality. In L. Pervin, & O. John (Eds.), *Handbook of personality* (2nd ed.) (p. 154-196). New York: Guilford.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1–26.
- Blanchard K., Carlos J. P., Randolph, A. (2001). *The three keys to empowerment: Release the power within people for astonishing results*. New York: Berrett-Koehler Publishers
- Bryce, J. & Haworth, J. (2002). Wellbeing and flow in sample of male and female office workers. *Leisure Studies*, 21, 249-263.
- Burns, N. & Grove, S. K. (1993). *The practice of nursing research, conduct, critique, and utilization* (2nd ed.). Philadelphia, PA: W.B. Saunders.
- Carr, A. (2004). *Positive Psychology: The science of happiness and human strength*. New York: Brummer-Routledge.
- Cilliers, F. & Kossuth, S. (2002). The relationship between organisational climate and salutogenic functioning. *South African Journal of Industrial Psychology*, 28(1), 8-13.
- Clark, L. A. & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment*, 7, 309-319.
- Cohen, J. (1988). *Statistical power analysis for the behavioural sciences*. (Revised ed.) Orlando, FL: Academic Press.
- Collins, D. (2003). Fixing the language of change? A response. *Journal of Organizational Change Management*, 16(5), 584-590.
- Colteryahn, K. & Davis, P. (2004, January). Trends you need to know. *Training and Development*, 28-36.
- Conger, J. A. & Kanungo, R. N. (1988). The empowerment process: Integrating theory and practice. *Academy of Management Review*, 13, 471-482.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*, San Francisco, CA: Jossey Bass.
- Csikszentmihalyi, M. (1988). The flow experience and its significance for human psychology. In M. Csikszentmihalyi, & I. S. Csikszentmihalyi (Eds.), *Optimal Experience: Psychological Studies of flow in Consciousness* (p. 15-35). New York: Cambridge University Press.

- Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper and Row.
- Csikszentmihalyi, M. (1992). *Flow: The psychology of happiness*. London: Rider.
- Csikszentmihalyi, M. (1993). *The evolving self: A psychology for the third millennium*. New York: HarperCollins.
- Csikszentmihalyi, M. (1997). *Finding flow: The psychology of engagement with everyday life*. New York: HarperCollins.
- Csikszentmihalyi, M. (1999). If we are so rich, why aren't we happy? *American Psychologist*, 54, 821-827.
- Csikszentmihalyi, M. (2003). *Good business: Leadership, flow and the making of meaning*. London: Hodder and Stoughton.
- Csikszentmihalyi, M. & LeFevre, J. (1989). Optimal experience in work and leisure. *Journal of Personality and Social Psychology*, 56, 815-822.
- Demerouti, E., Bakker, A. B., Nachreiner, F. & Schaufeli, W. B. (2000). A model of burnout and life satisfaction amongst nurses. *Journal of Advanced Nursing*, 32, 454-464.
- Demerouti, E., Bakker, A. B., Nachreiner, F. & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, 86, 499-512.
- Dollard, M.F. & Winefield, A.H. (1998). A test of the demand-control-support model of work stress in correctional officers. *Journal of Occupational Health Psychology*, 3, 243-264.
- Du Preez, D. (2003, September). Insight into Organisational Challenges. *People Dynamics*, 28-30.
- Ellis, G. D., Voelkl, J. E. & Morris, C. (1994). Measurement and analyses issues with explanation of variance in daily experience using the flow model. *Journal of Leisure Research*, 26, 337-256.
- Elsass, P. M. & Veiga, J. F. (1997). Job control and job strain: A test of three models. *Journal of Occupational Health Psychology*, 2, 195-211.
- Eylon, D. & Herman, S., (1999). Exploring empowerment: One method for the classroom. *Journal of Management Education*, 23(1), 42-47.
- Ford, R. C. & Fottler, M. D. (1995). Empowerment: A matter of degree. *Academy of Management Executive*, 9(1), 21-28.

- Fredrickson, B. I. (2002). Positive emotions. In C. R. Snyder, & S. Lopez (Eds.). *The handbook of positive psychology* (p. 715-730). Oxford: Oxford University Press.
- Fredrickson, B.L. & Joiner, T. (2002, March). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science*, 13(2), 172-175.
- Fried, Y. & Ferris, G. R. (1987). The validity of job characteristics model: A review and meta-analysis. *Personnel Psychology*, 40, 287-322.
- Frischer, J. (2006) Laissez-faire Leadership versus Empowering Leadership in New Product Developing. *Philosophy and Science Studies*, 4, 3-14.
- Ghani, J. A. & Deshpande, S.P. (1994). Task characteristics and the experience of optimal flow in human-computer interaction. *The Journal of Psychology*, 128, 381-391.
- Ghani, J. A., Supnick, R. & Rooney, P. (1991). The Experience of Flow in Computer-Mediated and in Face-to-Face Groups, In J. I. DeGross, I. Benbasat, G. DeSanctis & C. M. Beath (Eds.), *Proceedings of the Twelfth International Conference on Information Systems* (p. 16-18). New York, December 16-18.
- Grau, R. M., Salanova, M. & Peiro, J. M. (2001). Moderating effects of self-efficacy on occupational stress. *Psychology in Spain*, 5, 63-74.
- Guest, D. E. (2004). The psychology of the employment relationship: an analysis based on the psychological contract. *Applied Psychology: An International Review*, 53, 541-555.
- Hackman, J. R. & Oldham, G. R. (1975). Development of the Job Diagnostic Survey. *Journal of Applied Psychology*, 60(2), 159-170.
- Harvan, H., Visser, D. & Crous, F. (2003). The internal career orientation of permanent and contracting information technology staff. *South African Journal of Industrial Psychology*, 29(3), 53-60.
- Haworth, J. T. & Evans, S. (1995). Challenge, skill and positive subjective states in the daily life of a sample of YTS students. *Journal of Occupational and Organisational Psychology*, 68, 109-121.
- Herzberg, F. (1966). *Work and the nature of man*. Cleveland, OH: World Publishing.
- International Council of Chemical Associations (ICCA) (2004). *Responsible Care Global Charter*. Retrieved from the World Wide Web on September 2007 www.icca-chem.org/pdf/Responsible%20Care%20Global%20Charter%20 (ICCA supplement to Chemicalweek).

- Johnson, P. R. (1994). Brains, heart and courage: keys to empowerment and self-directed leadership. *Journal of Managerial Psychology*, 9(2), 17-21.
- Kahnweiler, W. (1991). Human Resource Development and Empowerment. *Training and Development*, 7.
- Konczak, L. J., Stelly, D. J. & Trusty, M. L. (2000). Measuring Empowering Behaviors of Managers: Development of an Upward Feedback Instrument. *Educational and Psychological Measurement*, 60, 301-313.
- Kriese, P. (2007). *Job insecurity and self-efficacy in a chemical industry*. Unpublished master's dissertation, North-West University, Vaal Triangle Campus.
- Laramore, A. M. (1997). *The relationship between CEO empowering leadership, transformational leadership, and direct report feelings of empowerment: A multi-level analysis*. Illinois: Institute of Technology.
- Le Roux, A. (2005). *Job demands, job resources and work-related flow of employees in the mining industry in South Africa*. Unpublished master's dissertation, North-West University, Potchefstroom Campus.
- Leiter, M. P. (1993). Burnout as a developmental process: Consideration of models. In W. B. Schaufeli, C. Maslach & T. Marek (Eds.), *Professional burnout: Recent developments in theory and research*. (p. 237-250). Washington, DC: Taylor & Francis.
- Luthans, F. & Youssef, C. M. (2004). Human, social, and now positive psychological capital management: Investing in people for competitive advantage. *Organizational Dynamics*, 33(2), 143-160.
- Lutz, R. J. & Guiry, M. (1994). *Intense consumption experiences: Peaks, performances, and flows*. Paper presented at the Winter Marketing Educators' Conference, St. Petersburg, Florida.
- Maddux, J. E. (1995). *Self-efficacy, adaptation, and adjustment*. New York: Plenum.
- Maré, Z. (2007). *Leader empowering behaviour, organisational commitment and turnover intention within the gold mining industry*. Unpublished master's dissertation, North-West University, Potchefstroom Campus.
- May, D. R., Gilson, R. L. & Harter, L. M. (2004). The psychological conditions of meaningfulness, safety and availability and the engagement of the human spirit at work. *Journal of Occupational and Organisational Psychology*, 77, 11-37.

- Menon, S. T. (2001). Employee empowerment: An integrative psychological approach. *Applied Psychology*, 50(1), 153-180.
- Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.) New York: McGraw-Hill.
- Rothmann, S. & Van Rensburg, P. (2001). *Suicide ideation in the South African Police Services*. Paper presented at the 10th European Congress on Work and Organizational Psychology, Prague, Czech Republic, 8-10 May 2001.
- Saavedra, R. & Kwun, S. K. (2000). Affective states in job characteristics theory. *Journal of Organizational Behavior*, 21, 131-146.
- Salanova, M., Bakker, A. B. & Llorens, S. (2006). Flow at work: Evidence for a gain spiral of personal and organizational resources. *Journal of Happiness Studies*, 7, 1-22
- Salanova, M., Grau, R. M., Cifre, E. & Llorens, S. (2000). Computer training, frequency of usage and burnout: The moderating role of computer self-efficacy. *Computers in Human Behavior*, 16 (6), 575-590
- Salanova, M., Llorens, S., Cifre, E., Martinez, I. & Schaufeli, W. B. (2003). Perceived collective efficacy, subjective well-being and task performance among electronic work groups: An experimental study. *Small Groups Research*, 34, 43-73.
- Schwarzer, R. (1992). *Self-efficacy: Thought control of action*. Washington, DC: Hemisphere.
- Schwarzer, R. (1998). General perceived self-efficacy in 14 cultures. Retrieved October 10, 2008, from the World Wide Web: <http://userpage.fu-berlin.de/~health/world14.htm>.
- Schwarzer, R. & Jerusalem, M. (1995). Generalized Self-efficacy Scale. In J. Weinman, S. Wright, & M. Johnston (Eds.), *Measures in Health Psychology: A user's portfolio*. (p. 35-37). Windsor, UK: NFER-NELSON.
- Schwarzer, R. & Luszczynska, A. (2007). Perceived self-efficacy. Retrieved October 10, 2008, from the World Wide Web: <http://dccps.cancer.gov/brp/constructs/self-efficacy/self-efficacy.pdf>.
- Seligman, M. E. P. & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, 55, 5-14.
- Shaughnessy, J. J. & Zechmeister, E. B. (1997). *Research methods in psychology* (4th ed.). New York: McGraw-Hill.
- SPSS Inc. (2007). *SPSS 15.0 for Windows*. Chicago, IL: Author.

- Steyn, H. S. (1999). *Praktiese beduidendheid: Die gebruik van effekgroottes*. [Practical significance: The use of effect sizes.] Wetenskaplike bydraes – Reeks B: Natuurwetenskappe Nr 117. Potchefstroom: PU vir CHO.
- Strümpfer, D. J. W. (2003). Resilience and Burnout: A stitch that could save nine. *South African Journal of Psychology*, 33(2), 69-70.
- Swart, J. (2006). *The relationship between job characteristics, work wellness and work-related flow with call centre agents in an insurance company*. Unpublished master's dissertation, North-West University, Potchefstroom Campus.
- Tabachnick, B. G. & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Boston, MA: Allyn and Bacon.
- Tannenbaum, A. S. (1986). Back to basics: Beyond perception. In R. N. Stern, & S. McCarthy (Eds.), *International yearbook of organisational democracy for the study of participation, co-operation and power: Volume III, The organisational practice of democracy* (p. 323-331). New York: John Wiley.
- Turner, N., Barling, J. & Zacharatos, A. (2002). Positive psychology at work. In C. R. Snyder, & S. J. Lopez (Eds.), *Handbook of positive psychology* (p. 715-728). Oxford: Oxford University Press.
- Veldsman, T. (2003, August). Keeping up with change. *People Dynamics*, 33-35.
- Vogt, J. F. & Murrell, K. L. (1990). Empowerment in small business. *Participation and Empowerment: An International Journal*, 7(7), 180-193.
- Webster, J., Trevino, L. K. & Ryan, L. (1993). The dimensionality and correlates of flow in human computer interactions. *Computers in Human Behavior*, 9, 411-426.
- Whitener, E. M. (2001). Do "high commitment" human resources practices affect employee commitment? A cross-level analysis using hierarchical linear modelling. *Journal of Management*, 27(5), 515-535.
- Wong, C. S., Hui, C. & Law, K. S. (1998). A longitudinal study of the job perception-job satisfaction relationship: A test of the three alternative specifications. *Journal of Occupational and Organizational Psychology*, 71, 127-146.

CHAPTER 3

CONCLUSIONS, LIMITATIONS AND RECOMMENDATIONS

The purpose of this chapter is to provide conclusions regarding the results obtained in the empirical studies of the research article. Conclusions are drawn with regard to the research objectives. Furthermore, limitations that have been identified throughout the course of the study are discussed. Finally, recommendations for the organisation are made and research opportunities that emanate from this research are presented for future research.

3.1 CONCLUSIONS

The general objective of this research was to determine the predicting relationship of leader empowering behaviour, self-efficacy and job characteristics on work-related flow of employees in selected sectors in the chemical industry. More specifically, the study examined whether personal and organisational resources facilitate flow at work; whether employees who experience flow mobilise more resources over time; and the role that leader empowering behaviour and self-efficacy has in this process.

The first objective of the study was to conceptualise leader empowering behaviour, self-efficacy, job characteristics and work-related flow in the literature. *Leader empowering behaviour* was conceptualised as the process of giving people the power to do the work as demanded by the position, through greater responsibility, decision-making authority, information and feedback as well as motivation, support and encouragement (Johnson, 1994). Konczak, Stelly and Trusty (2000) identify certain dimensions of leader empowering behaviour: *Delegation of Authority, Accountability for Outcomes, Self-Directed and Participative Decision-making, Information Sharing, Skills Development and Coaching*.

Self-efficacy is conceptualised by Bandura (1982) as a self-judgment of one's ability to perform a task in a specific domain. *Job demands* were conceptualised as the characteristics of the job that require sustained physical and/or mental effort, and that are therefore associated with certain physiological and/or psychological costs. *Job resources* were identified as physical, psychosocial

or organisational aspects of the job that may be functional in meeting job demands, and that may thus reduce the associated physiological and/or psychological costs, while at the same time stimulating personal growth and development (Bakker & Geurts, 2004).

Work-related flow has been conceptualised as a process of optimal experience (Csikszentmihalyi, 1975, 1988, 1992, 1993, 1997), as the consequence of a situation wherein challenges faced by an individual equal his or her skills (Ellis, Voelkl & Morris, 1994; Ghani & Deshpande, 1994), and as a short-term peak experience at work that is characterised by absorption, work enjoyment and intrinsic work motivation (Bakker, 2004).

The second objective of this study was to determine the relationship between leader empowering behaviour, self-efficacy, job characteristics and work-related flow according to the literature.

The mobilisation of resources and deployment of leadership empowering behaviours link up strongly with the notion of self-efficacy, which refers to a broad sense of personal competence to deal effectively with a variety of stressful situations (Schwarzer & Luszczynska, 2007). The literature suggests that self-efficacy can be positively affected by various interventions (Schwarzer, 1998). Luthans and Youssef (2004) also describe self-efficacy as a state that can be developed through workplace interventions and proactive management.

Studies have found that a strong sense of self-efficacy is related to better health (Maddux, 1995; Schwarzer, 1992). In addition, Bandura (1986) has shown that self-efficacy has an influence on the amount of effort employees put into their jobs and whether employees are able to persist when faced with obstacles that will influence job performance, including organisational citizenship behaviour. It is therefore expected that people with higher levels of self-efficacy will experience better health and demonstrate more organisational citizenship behaviour.

If work-related flow can be viewed as a consequence of a proper balance between job demands and job resources, then it seems that job demands and job resources are role players within the accumulation of self-efficacy. Given the fact that leader empowering behaviour and self-efficacy are indicators of the existence of work-related flow, Bakker (2004) suggests that they could be

combined in a model of wellbeing. Bakker (2004) found that when individuals are able to balance their job demands and job resources, they will be more open to positive experiences (such as flow) in the work situation, which may result in better performance by those individuals.

Although there is no direct empirical evidence that job resources are related to work-related flow, indirect evidence does suggest it (Csikszentmihalyi, 1997; Le Roux, 2005). Within South Africa, and specifically in the chemical industry, no research could be found investigating the relationship between leader empowering behaviour, self-efficacy, job resources and work-related flow. It is therefore important to determine the relationship between these constructs within the chemical industry and to determine whether the experience of work-related flow mobilises job resources.

The third objective of this study was to determine the construct validity and internal consistency of the different measuring instruments of leader empowering behaviour, self-efficacy, job characteristics (i.e. job demands and resources) and work-related flow in a sample in the chemical industry. Acceptable Cronbach alpha coefficients varying from 0,75 to 0,95 were obtained. These alpha coefficients compare reasonably well with the guideline of 0,70 (0,55 in basic research), demonstrating that a large proportion of the variance is explained by the dimensions (internal consistency of the dimensions) (Nunnally & Bernstein, 1994). It is evident from the research that most of the scales of the measuring instruments have relatively normal distributions with low skewness and kurtosis, except for accountability and skills development.

The fourth objective of this study was to determine the relationship between leader empowering behaviour, self-efficacy, job characteristics and work-related flow in selected sectors in the chemical industry. The results of the research indicate that the availability of leader empowering behaviour (i.e. delegation of authority, self-directed decision making, information sharing and coaching for innovative performance), self-efficacy and job resources (i.e. supervision, resources availability and autonomy) can result in higher levels of work-related flow.

Leader empowering behaviours correlated positively with work-related flow. This suggests that the behaviour of management in the chemical industry can have a direct effect on the ability of

its workers to experience work-related flow, with resultant business benefits that include increased productivity, lower absenteeism and improved staff retention. This bears out the findings of the literature that leader empowering behaviour creates a mutually beneficial situation, as customers benefit from engaged employees; organisations benefit from satisfied customers and engaged employees; and employees benefit from improved confidence and self-esteem (Vogt & Murrell, 1990).

Self-efficacy had a significant positive correlation with work-related flow. This suggests that the ability of employees to perform at an optimum level is an important predictor of flow within an organisation. This is an important finding, as high levels of self-efficacy can mobilise workers to perform more effectively in the workplace (Bandura 1997, 2001) and can buffer the negative impact of job demands on burnout (Salanova, Grau, Cifre & Llorens, 2000; Salanova, Llorens *et al.*, 2003).

Another significant positive correlation was found between resources availability and work-related flow. This bears out the findings of previous research by Bakker, Demerouti and Verbeke (2004), and in South Africa by Le Roux (2005) and Swart (2006), that indicated reciprocal relationships between resources and work-related flow.

The fifth objective of this study was to determine whether the availability of leader empowering behaviour, self-efficacy and job characteristics enhance the experience of work-related flow. The research shows that 37 percent of the variance explained in work-related flow was predicted by job characteristics. The only significant predictors of work-related flow were supervision, job security, resources availability and autonomy. When leader empowering behaviour was added to the multiple regression analysis, 45 percent of the variance explained in work-related flow was predicted by job characteristics and leader empowering behaviour. Here the only significant predictors of work-related flow were job security, autonomy and delegation of authority. When self-efficacy was added to the multiple regression analysis, 48 percent of the variance explained in work-related flow was predicted by job characteristics, leader empowering behaviour and self-efficacy. In this case, the only significant predictors of work-related flow were job security, autonomy, delegation of authority and self-efficacy. It therefore appears that when employees

experience higher levels of job security, autonomy, delegation of authority and self-efficacy, they will also experience higher levels of work-related flow.

The sixth objective of this study was to determine the differences in the experience of work-related flow in a sample of employees in the chemical industry. It seems that employees in higher managerial positions tend to experience more work-related flow. Employees working in the fertiliser environment also experience statistically significant higher levels of work-related flow in comparison with employees working in the petroleum environment. However, it is possible that the findings in this research may be attributed to circumstances that are specific to the organisations under investigation. Further research would be necessary to establish this.

3.2 LIMITATIONS OF THIS RESEARCH

The first limitation of this study was the use of a cross-sectional survey design. To deal with the limitation of the use of a cross-sectional design, prospective longitudinal and quasi-experimental research designs are needed to further validate the hypothesised causal relationships within the study.

The second limitation was the size of the sample. The response from the chemical workers was poor due to the demanding shift working environment. Only 213 of the 300 surveys were retrieved. Results were obtained solely by self-report measures. This may lead to a problem known as “method variance” (Dollard & Winefield, 1998).

A third limitation was the fact that the questionnaires were sent out by e-mail. The participants who had access to e-mail, printed the questionnaire booklet, distributed it to colleagues who did not have access to e-mail, and completed it either at home or at work. Some individuals working in the same area might have discussed the answers, and this could have influenced their responses. Moreover, the questionnaire was available only in English. The possibility exists that respondents’ level of English language skills may also have influenced the results.

A fifth limitation was that only selected job demands and job resources were included in this study. It is possible that certain information was not included in the compilation of the instrument. It may therefore be necessary to investigate the factor structure of the JDRS in other organisations in the chemical industry.

3.3 RECOMMENDATIONS

Recommendations for the management of the organisation and for future research are made in this section.

3.3.1 Recommendations for the organisations

To put the organisation of the future in a position where it can achieve responsiveness, innovation, speed, flexibility and cost-effectiveness, it is crucial to increase levels of performance even more (Veldsman, 2003). Apart from only focusing on achievement of higher levels of performance, there further needs to be a focus on eliminating aspects that may affect employee engagement negatively.

Bakker (2004) found that when individuals are able to balance their job demands and job resources, they will be more open to positive experiences (such as flow) in the work situation, which may result in better performance by those individuals. To best assist the chemical industry in maximising performance, other constructs that positively affect employees (other than leader empowering behaviour, self-efficacy, job characteristics and work-related flow characteristics) need to be examined. It is therefore recommended that the chemical industry specifically consider these other constructs when trying to achieve higher levels of performance.

A key recommendation is that managers in selected sectors in the South African chemical industry need to pay more attention to establishing leader empowering behaviours in their organisations. This can be achieved through interventions such as coaching, making employees accountable, delegating authority and sharing information, all of which correlate positively with work-related flow. The behaviour of management in the chemical industry can have a direct

effect on the ability of its workers to experience work-related flow, with the resultant business benefits that include increased productivity, lower absenteeism and improved staff retention.

It is also recommended that managers in the chemical industry investigate and implement interventions that will lead to strengthened self-efficacy which, in turn, will improve employees' chances of reaching a state of flow. This can be achieved by identifying conditions that foster powerlessness and by removing the practices and techniques that create them.

A further recommendation is that managers in the South African chemical industry should work toward finding ways of striking a proper balance between job resources and job demands in the workplace. Workers can function effectively when high job demands are made of them if the correct levels of resourcing are in place. However, low job demands may result in workers losing interest, which will have a negative effect on the business. This highlights the need for a fine balance to be struck between job demands and job resources, and for the need to monitor this relationship on an ongoing basis.

Apart from understanding the constructs which could possibly increase higher levels of performance, it is also important to do more research to determine constructs that negatively impact on levels of performance and on work-related flow in the chemical industry. This might also result in consequently higher levels of performance, thus enhancing the competitiveness of the chemical industry.

3.3.2 Recommendations for future research

One of the limitations of this study is the use of a cross-sectional survey design. More valid results might have been obtained by using longitudinal research. A further limitation is the fact that the results were solely obtained by self-report measures. This may lead to a problem known as "method variance" or "nuisance" (Dollard & Winefield, 1998). Although the respondents spoke several different languages, the questionnaire was available only in English. The respondents' level of proficiency in English could have influenced the results. It is also possible that certain relevant job characteristics applicable to the chemical industry were not included in

the job demands and resources scale. The factor structure of the JDRS should therefore be investigated in other organisations in the chemical industry. Similar studies need to be undertaken for other samples from the chemical industry, and future longitudinal research should be conducted to identify the causal nature of – and determine the relationship between – variables and to ascertain which variables could enhance work-related flow. Larger sample sizes would also allow for testing of construct equivalence and item bias in multicultural samples. The inclusion of personality dimensions is recommended to establish the effects of personality differences on work-related flow experienced in the chemical industry.

REFERENCES

- Bakker, A. B. (2004). *Development and validation of the Work-Related Flow inventory (WOLF)*. Utrecht University, Department of Social and Organizational Psychology, and Research Institute Psychology and Health, Utrecht, The Netherlands.
- Bakker, A. B. & Geurts, S. A. E. (2004). Towards a dual-process model of work-home interference. *Work and Occupations*, 31, 345-366.
- Bakker, A. B., Demerouti, E. & Verbeke, W. (2004). Using the job demands-resources model to predict burnout and performance. *Human Resource Management*, 43(1), 83-104, Spring.
- Bandura, A. (1982). Self-efficacy mechanisms in human agency. *American Psychologist*, 37, 122-147.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*, San Francisco, CA: Jossey-Bass.
- Csikszentmihalyi, M. (1988). The flow experience and its significance for human psychology. In M. Csikszentmihalyi & I. S. Csikszentmihalyi (Eds.), *Optimal Experience: Psychological Studies of flow in Consciousness* (p. 15-35). New York: Cambridge University Press.
- Csikszentmihalyi, M. (1992). *Flow: The psychology of happiness*. London: Rider.
- Csikszentmihalyi, M. (1993). *The evolving self: A psychology for the third millennium*. New York: HarperCollins.
- Csikszentmihalyi, M. (1997). *Finding flow: The psychology of engagement with everyday life*. New York: HarperCollins.
- Dollard, M. F. & Winefield, A. H. (1998). A test of the demand-control-support model of work stress in correctional officers. *Journal of Occupational Health Psychology*, 3, 243-264.
- Ellis, G. D., Voelkl, J. E. & Morris, C. (1994). Measurement and analyses issues with explanation of variance in daily experience using the flow model. *Journal of Leisure Research*, 26, 337-256.
- Ghani, J. A. & Deshpande, S. P. (1994). Task characteristics and the experience of optimal flow in human-computer interaction. *The Journal of Psychology*, 128, 381-391.

- Johnson, P. R. (1994). Brains, heart and courage: keys to empowerment and self-directed leadership. *Journal of Managerial Psychology*, 9(2), 17-21.
- Konczak, L. J., Stelly, D. J. & Trusty, M. L. (2000). Measuring Empowering Behaviors of Managers: Development of an Upward Feedback Instrument. *Educational and Psychological Measurement*, 60, 301-313.
- Le Roux, A. (2005). *Job demands, job resources and work-related flow of employees in the mining industry in South Africa*. Unpublished masters' dissertation, North-West University, Potchefstroom Campus.
- Nunnally, J. C. & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.) New York: McGraw-Hill.
- Salanova, M., Bakker, A. B. & Llorens, S. (2006). Flow at work: Evidence for a gain spiral of personal and organizational resources. *Journal of Happiness Studies*, 7, 1-22
- Salanova, M., Grau, R. M., Cifre, E. & Llorens, S. (2000). Computer training, frequency of usage and burnout: The moderating role of computer self-efficacy. *Computers in Human Behavior*, 16 (6), 575-590
- Swart, J. (2006). *The relationship between job characteristics, work wellness and work-related flow with call centre agents in an insurance company*. Unpublished masters dissertation, North-West University, Potchefstroom Campus.
- Veldsman, T. (2003, August). Keeping up with change. *People Dynamics*, 33-35.
- Vogt, J. F. & Murrell, K. L. (1990). Empowerment in small business. *Participation and Empowerment: An International Journal*, 7(7), 180-193.