ONCE MORE: TESTING THE JOB CHARACTERISTICS MODEL

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DECLARATION

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ABSTRACT

The Job Characteristics Model (JCM) is one of the most widely used and researched models in the field of Industrial Psychology. It has provided industry with useful solutions for its people-related business problems through the rearranging of the physical and psychological characteristics of jobs in order to address demotivation, dissatisfaction and marginal performance.

The JCM has also endured a fair amount of criticism, however, specifically pertaining to the mediating role of the psychological state variables. Research findings on the model are divided into two camps. Some researchers argue that the model is empirically sound; while others believe the model should be discarded or adjusted. These studies were done circa 1990, however, when most of the advanced statistical analysis techniques utilised today were not available. Research related to the JCM has been decreasing steadily since then, and it seems that no final verdict was reached regarding the utility and validity of the model.

The overarching objective of this study is to provide closure regarding this discourse by testing the three major theoretical postulations of the JCM in the South African context on a sample of 881 students with an ex post facto correlational research design. This was achieved by utilising structural equation modelling via LISREL.

Three separate structural models were fitted and compared. The first model was a simplified version of the original model (Hackman & Oldham, 1980). The second model excluded the mediating psychological states proposed by Boonzaier, Ficker and Rust (2001). The final model had the same basic structure as the first model, but more causal paths were included between the job characteristics and the psychological states.

The results show that more variance in the outcomes is explained with the inclusion of the psychological state variables. The psychological states are therefore a crucial component of the model. Although these findings corroborated the original model, the third model displayed superiority in terms of accounting for significant amounts of outcome variance in the dependent variables. These findings indicate that the job characteristics predict the psychological states in a more comprehensive manner than originally proposed in the literature.

Job design interventions thus remain a useful tool and industry should utilise the suggested interventions. Furthermore, this study proposes preliminary equations (a Motivating Potential Score and resource allocation) that may be used to determine the relative importance attached to each job characteristic in the world of work.

OPSOMMING

Die Taakeienskappe Model (*Job Characteristics Model,* JCM) is een van die Bedryfsielkunde-modelle wat die meeste gebruik en nagevors word. Dit het aan die bedryf bruikbare oplossings vir mensverwante besigheidsprobleme verskaf deur die herrangskikking van die fisiese en sielkundige eienskappe van werk om probleme soos demotivering, ontevredenheid en marginale prestasie aan te spreek.

Die JCM is egter ook al baie gekritiseer, spesifiek rondom die bemiddelende rol van die sielkundige toestand veranderlikes. Navorsingsbevindinge oor die model word in twee groepe verdeel. Die een groep argumenteer dat die model empiries foutvry is, terwyl die ander groep glo dat dit weggedoen of aangepas moet word. Hierdie studies is egter in die 1990's gedoen, toe die meeste van die gevorderde statistiese tegnieke wat vandag gebruik word, nie bestaan het nie. Navorsing oor die JCM het sedertdien stadig maar seker afgeneem, en geen finale besluit oor die bruikbaarheid en geldigheid van die model is al geneem nie.

Die oorkoepelende doel van hierdie navorsing was om van die bogenoemde probleme te probeer oplos deur drie vername teoretiese uitgangspunte oor die JCM in die Suid-Afrikaanse konteks te toets deur middel van 'n steekproef van 881 studente. Dit is met behulp van struktuurvergelykingsmodellering deur middel van LISREL gedoen. 'n "Ex post facto" korrelasionele navorsings ontwerp is benut.

Drie aparte strukturele modelle is gepas en vergelyk. Die eerste model was 'n vereenvoudigde weergawe van die oorspronklike een (Hackman & Oldham, 1980). Die tweede model het die bemiddelende sielkundige toestande uitgelaat wat deur Boonzaier, Ficker en Rust (2001) voorgestel is. Die finale model het dieselfde basiese struktuur as die eerste een gehad, maar nuwe oorsaaklike weë is tussen die werkseienskappe en sielkundige toestande ingesluit.

Die resultate toon dat meer variansie in die uitkomstes verduidelik word wanneer die sielkundige toestand veranderlikes wel ingesluit word. Die sielkundige toestande is dus 'n kritieke komponent van die model. Hoewel hierdie bevindinge die oorspronklike model staaf, het die derde model die noemenswaardige variansie in uitkomstes van die afhanklike veranderlikes beter verklaar. Hierdie bevindinge dui

daarop dat die werkseienskappe die sielkundige toestande meer omvattend voorspel as wat aanvanklik in die literatuur voorgestel is.

Werksontwerp-intervensies is dus nog steeds ’n bruikbare hulpmiddel en die bedryf moet die voorgestelde intervensies gebruik. Hierdie studie stel ook voorlopige vergelykings voor (Motiverings Potensiaal Telling en hulpbrontoewysing) wat gebruik kan word om die relatiewe belangrikheid van elke werkskenmerk in die wêreld van werk te bepaal.

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CHAPTER 1
INTRODUCTION

This introductory section aims to provide an orderly, reasoned argument to justify the research conducted. It presents arguments about how job design theories fit into organisations, while furthermore highlighting the inadequacies in this field. This argument gave birth to the research-initiating question, from which the research objectives stem.

1.1 BACKGROUND

A stable and growing economy is a prerequisite for society to experience quality of life. In a broad sense, capitalist countries must allow the forces of supply and demand to be in harmony to ensure this. By letting the so-called 'invisible hand' (Smith, 1776) adjudicate, the population itself will realise that there exists a deficit or surplus of a product or service and move to correct it[1]. This is achieved through the incentive of profit or loss.

The vehicle that society utilises and places the onus on to balance the scales of supply and demand is organisations. Organisations are groupings of people that exist primarily to achieve some goal. These goals would be impossible to achieve if people acted individually (Gibson, Ivancevich & Donnelly, 1997). Consequently, people group together to ensure a better chance of achieving these goals. In the private sector, most organisations' primary goal is profit. In essence, the organisation will attempt to make more money than it spends by simply keeping expenditure lower than income.

Organisations will mobilise their profit motives by fulfilling the basic economic principle of creating value by using a three-cycle input, conversion and output process (Jones, 2001). This value-creation process, guided by a goal of maximum economic utility, can take on a variety of forms depending on the type of economic sector. A prime example is the manufacturing industry. Manufacturing companies acquire raw materials (input) and convert this into something of value (output). They may also combine various forms of raw materials to produce something of worth to

[1] This is a gross oversimplification of how the economy works.

society. Retailers bring together a range of outputs (inputs for the retailer) from suppliers in one location. Here, value is created by providing convenience (output) to the customer. The output must satisfy some demand (or need) of society, otherwise it will be redundant. The effectiveness and efficiency of this process is hinged on the quality of the human capital possessed.

There are a vast number of companies providing a similar product or service to the market. Companies must attempt to distinguish themselves from their competitors by having a sustained competitive advantage that is a result of an enduring value differential in the minds of customers (Morris, Karatho & Covin, 2011). This entails having a strategic advantage over one's competitors or occupying some unique competitive space, such as control of a scarce resource, expert human capital or a unique production method. This advantage must be enduring, as it must be the core reason for the business making money (sustaining), or it should endure at least until a different one is found.

To achieve a competitive advantage, organisations coordinate their functions (which are interdependent) to stay as effective and efficient as possible. The importance of each function to the organisations' profitability has shifted in the course of history. In the industrialisation period, the production function was considered key, while in the late 20th century organisations relied more on their technology (research and development) functions to stay ahead of the competition. This focus seems to be shifting again. Today, organisations are realising the real value of their people and the monetary implications of managing them properly and utilising their capabilities effectively.

One of the primary functions of organisations is the Human Resources function. This function manages, coordinates and regulates all aspects of the business related to people. The bottom line in any Human Resource practice is to contribute to the performance of the company[2] as a whole by moving to affect the performance of all of the employees combined, thereby justifying its inclusion as a primary organisational function. The Human Resource function will pursue organisational

[2] This contribution is guided by a Human Resource strategy, which is carefully aligned with the core business strategy.

goals by not only affecting human performance on a macro-level, but on a micro-level as well.

One of the methods that the Human Resource function uses to affect micro-performance is through sets of motivational practices. Kinicki and Williams (2006) define motivation as the psychological processes that arouse and inspire goal-directed behaviour. Thus, employees can be motivated to pursue the goals of the organisation with commitment and vigour. The Human Resource function can utilise a range of motivational practices, from the use of incentive programmes to more subtle forms such as job design.

Job design theories suggest that the way in which jobs are structured affects the performance of the incumbent[3]. Hackman and Oldham (1976, 1980) suggest that a major influence on organisational productivity is the quality of the relationship between people who do the work and the jobs they perform. These authors consequently created the Job Characteristics Model[4] to explain this relationship.

1.2 THE JOB CHARACTERISTICS MODEL

Hackman and Oldham (1976, 1980) proposed five job characteristics that prompt individuals to experience certain critical psychological states, which may be manipulated to ultimately create positive outcomes for the individual and the organisation.

The five characteristics (Table 1.1) translate into critical psychological states, which are internal to the person. Firstly, skill variety, task identity and task significance all contribute to the experienced meaningfulness of a job. The person must experience the work as meaningful or as something he/she matches with his/her value system (Hackman & Oldham, 1976, 1980). Secondly, autonomy contributes to the persons' sense of responsibility for the outcomes of the work (Hackman & Oldham, 1976, 1980). Finally, job feedback provides information regarding the job performed and gives the individual knowledge of the results (Hackman & Oldham, 1976, 1980). To sum up, individuals who obtain internal rewards (experienced meaningfulness) when they learn (knowledge of results) that they personally (experienced responsibility)

[3] These performance benefits may stem directly from the manner in which jobs are designed, or indirectly via positive organisational outcomes such as job satisfaction.
[4] Hereafter referred to as the JCM.

have performed the task well that they care about will tend to display the outcomes proposed (Hackman & Oldham, 1976, 1980).

Table 1.1

Job Characteristics with Constitutive Definitions

JOB CHARACTERISTIC	CONSTITUTIVE DEFINITION
Skill Variety	The degree to which the job requires a variety of different activities in carrying out the work, involving the use of a number of different skills and talents of the individual.
Task Identity	The degree to which the job requires completion of a 'whole' and identifiable piece of work, such as doing the total job from beginning to end.
Task Significance	The degree to which a job has substantial impact on the lives of other people.
Autonomy	The degree to which the job provides substantial freedom, independence and discretion to the individual in scheduling the work, and in determining the procedures to be used in carrying it out.
Job Feedback	The degree to which carrying out the work activities required by the job provides the individual with direct and clear information about the effectiveness of his/her performance.

(Hackman & Oldham, 1976, 1980)

Hackman and Oldham (1976, 1980) believe the possible outcomes of job design include high work effectiveness[5], high job satisfaction, high growth satisfaction and high internal motivation. These outcomes together with their constitutive definitions can be seen in Table 1.2.

Hackman and Oldham (1976, 1980) recognised that not all employees will respond in the same manner to adjustments in the job characteristics. Consequently, they proposed that there are certain variables that moderate the job characteristics-psychological states and psychological states-outcome relationship[6]. A schematic portrayal of the model in its entirety can be seen in Figure 1.1. The primary data collection method to tap the dimensions of the JCM is the Job Diagnostic Survey

[5] It must be noted, however, that the work effectiveness outcome variable will be omitted for this study. This was done due to the fact that it is notoriously difficult to measure. It is furthermore not captured by the model's data-gathering instrument.

[6] The moderator variables will be omitted for this study. Some authors have provided strong evidence that GNS is not a significant moderator (Tiegs, Tedrick & Fried, 1992). Also, testing the moderators in structural equation modelling (SEM) would prove cumbersome, as it would require a large amount of new paths and therefore hypotheses.

(JDS)[7]. The JDS was designed specifically to measure each variable of the JCM and to determine how people react to their jobs. The major uses of the JDS are to diagnose existing jobs prior to work redesign and to evaluate the effects of work redesign (Hackman & Oldham, 1980).

Table 1.2

Outcomes with Constitutive Definitions

OUTCOMES	CONSTITUTIVE DEFINITION
High Work Effectiveness (Organisational outcome)	Quality and quantity of goods/services produced.
High Job Satisfaction (Personal outcome)	General satisfaction with the job held.
High Internal Motivation (Personal outcome)	Stimulation that drives an individual to act and strive for his/her own internal satisfaction or fulfilment.
High Growth Satisfaction (Personal outcome)	Satisfaction with the opportunities that are given on the job to grow personally and in one's vocation.

(Hackman & Oldham, 1976, 1980)

The JDS measures the job characteristics, employees' experienced psychological states and personal outcomes. A job that is high in motivating potential would be high on at least one of the three characteristics that prompt experienced meaningfulness, and also high on both autonomy and feedback, thereby creating conditions that foster all three psychological states (Hackman & Oldham, 1980). The motivating potential score (MPS) is a measure of the degree to which these states are met. These states are combined using a multiplicative formula to determine the overall motivating potential of a job (Hackman & Oldham, 1980):

*MPS = (Skill Variety + Task Identity + Task Significance)/3*Autonomy*Feedback*

The JCM has provided a major thrust for research on and the practice of issues of job design (Evans & Ondrack, 1991) and has provided industry with valuable explanations for variations in employee performance. Many scholars advocate the

[7] This discussion on the JDS would be better placed in the methodology chapter; however, the instrument plays a crucial part in understanding the manner in which the entirety of the model operates (specifically the MPS score).

value of the model in practical settings, although there are even more who raise serious concerns about the model.

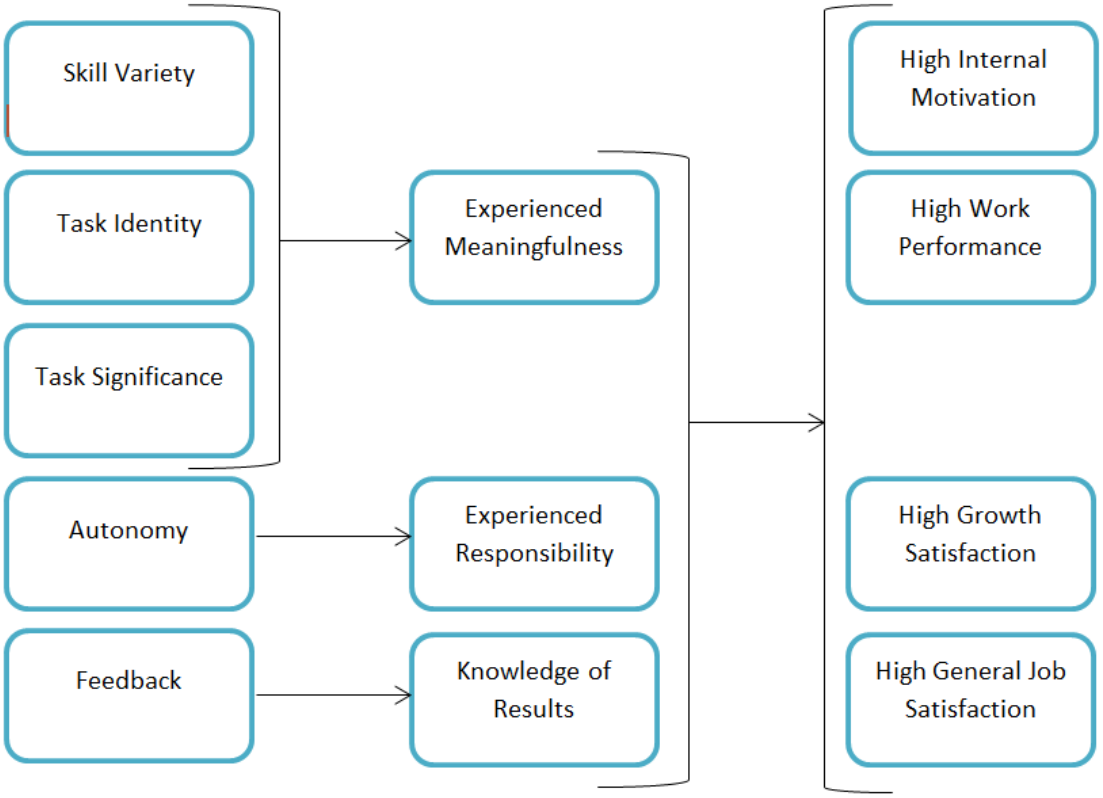

***Figure 1.1*. The Job Characteristics Model**[8] (Hackman & Oldham, 1980)

1.3 THE IMPERATIVE FOR REVISION

Many questions have been raised regarding the mediating effect of psychological states. Boonzaier, Ficker and Rust (2001) highlighted important concerns: (1) whether all three psychological states are necessary for positive outcomes to emerge, (2) whether the relationships between the job characteristics and psychological states exist as specifically prescribed by the model, and (3) whether the psychological states are complete mediators of the relationships between the job characteristics and outcomes. After an inquiry into a large number of studies, these authors concluded that the specified relationships between the psychological states were not confirmed by empirical evidence, as some job characteristics relate to the psychological states in ways not stated by the model, and also that the status of each state differs in major ways (Boonzaier et al., 2001).

[8] Moderating variables and work effectiveness omitted.

These authors were not alone in their concerns; there are an increasing number of researchers who have questioned the relationship between the job characteristics and psychological states (Becherer, Morgan & Richard, 1982; Fried & Ferris, 1987; Renn, 1989). These researchers found paths not initially suggested by the model, such as skill variety having an effect on experienced responsibility.

Furthermore, there are an increasing number of studies that suggest that there are direct relationships between the job characteristics and the outcomes (Fried & Ferris, 1987; Hogan & Martell, 1987; Renn & Vandenberg, 1995). These authors suggest that the psychological states are an unnecessary complication to the model.

Again, these authors identify important concerns. Is the inclusion of the critical psychological states in the model properly justified? If so, are the relationships between the job characteristics and critical psychological states that Hackman and Oldham (1980) propose warranted?[9]

Boonzaier et al. (2001, p. 13) conclude as follows:

> Let's state that the JCM does offer pointers for diagnosing work situations, but from a theoretical perspective the model is still fairly obscure. This is particularly true for the critical psychological states...

1.4 RESEARCH OBJECTIVES

Hackman and Oldham (1980) propose that certain job characteristics create specific psychological states that translate into a set of outcomes. Many researchers, however, have questioned these relationships within the model, specifically the mediating role of the psychological states (Becherer et al., 1982; Boonzaier et al., 2001; Fried & Ferris, 1987; Hogan & Martell, 1987; Renn, 1989; Renn & Vandenberg, 1995). Therefore, these relationships cannot be accepted blindly and the model requires further investigation, specifically with regard to the mediating role of the critical psychological states. Many scholars have attempted to do this, but the model remains the number one choice when it comes to work design. Consequently,

[9] If these relationships are different than originally proposed, it would imply that each job characteristic carries a unique weight, and the MPS formula consequently would need revision to acknowledge this.

this study will attempt to reach clarity by investigating the nature of the psychological states in the JCM.

The research objectives are as follows:

1. An examination of the relationships between the job characteristics and critical psychological states the original theory neglected to recognise (Hackman & Oldham, 1980).

2. An inquiry into the direct relationships between job characteristics and the outcomes without the mediating psychological states.

3. Ultimately to make a decision whether to include the psychological states in the model.

4. If the psychological states prove to be necessary, to develop a new MPS formula based on the unique weights each job characteristic carries.

5. If appropriate, to develop a new JCM based on the findings.

Although these objectives previously have been pursued by many researchers, it is important to note that this study will differ in that it will use some of the most advanced statistical techniques presently available (structural equation modelling via LISREL), which were not available when the majority of research on the JCM was conducted.

It is important to note that theoretical research on the JCM has stagnated. There seems to be a lack of consensus on whether or not the model is empirically sound. As DeVaro, Li and Brookshire (2007) put it, it would be a mistake to close the book and declare the model validated at this point. It therefore is important that a final verdict be reached so that industry can be provided with an empirically sound JCM (or not), which would provide useful solutions to their people-related problems. It is therefore essential to critically examine the research surrounding and making up the JCM to further this cause.

CHAPTER 2
LITERATURE REVIEW

Job design has a rich history, and it is crucial to understand its progression up until the JCM was formulated in order to comprehensively dissect and empirically test the JCM. This section will provide a structured, chronological depiction of the development of the work design field and, consequently, the JCM.

2.1 HISTORICAL INFLUENCES

One of the earliest comments on job design came from Adam Smith, whom some would consider one of the founding fathers of capitalism. A key feature in his writings is the emphasis placed on the division of labour, which was regarded as a method to enable higher work performance (Boonzaier, 2001). One of the most famous writings is where he describes how pins are manufactured:

> One man draws out the wire, another straights it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving, the head; to make the head requires two or three distinct operations; to put it on is a peculiar business, to whiten the pins is another; it is even a trade by itself to put them into the paper; and the important business of making a pin is, in this manner, divided into about eighteen distinct operations, which, in some manufactories, are all performed by distinct hands, though in others the same man will sometimes perform two or three of them. I have seen a small manufactory of this kind where ten men only were employed, and where some of them consequently performed two or three distinct operations (Smith, 1776, p. 3).

This mass-production paradigm viewed the worker as having one sole function so that he/she may be as productive as possible. There was a strong division between management and the working class. This paradigm in which work was thought of later developed into the idea of scientific management (Taylor, 1911). In his book, *The Principles of Scientific Management*, Taylor clearly states the objective of the scientific management paradigm:

> The principle object of management should be to secure the maximum prosperity for the employer, coupled with maximum prosperity for each employee (Taylor, 1911, p. 9)

The approach therefore attempted to move industry to greater efficiency so as to ensure a mutually beneficial relationship between the employee and employer. More specifically, Taylor (1911) advocated two different forms of division of labour, namely that between management and workers, and that between workers and themselves (Boonzaier, 2001). Managers were viewed as responsible for intellectual work, and workers were responsible for manual work, with no overlap existing between the two (Boonzaier, 2001). The basic idea of the approach was to design work with standardised operations and highly simplified tasks, so a person is essentially viewed as a cog in a giant machine. Employees would contribute by being highly specialised in their small task (repetition), but also expendable. In today's literature, this view might be described as resembling a mechanistic approach. At the time, this approach was considered the only method of designing work. However, motivational issues[10] among the working ranks soon surfaced and employers were again faced with a dilemma.

Buchanan (1979) was the one who recognised the problem. Task specialisation was proposed to lead to monotony and boredom, which in turn would result in low output and morale (Buchanan, 1979). The solution was to enlarge and rotate jobs to ensure variety, which would then solve the abovementioned problem (Buchanan, 1979). This approach was regarded as the first stab at job design in reaction to the problems of Taylorism (Boonzaier, 2001). The initial job redesign proposition therefore was designed to counteract the negative effects of job simplification and specialisation.

Later in the 20th century, Herzberg developed a radical approach to job design which held the premise that, in order to motivate employees to do their work well, jobs should be enriched rather than simplified (Herzberg, 1966, 1976). Specifically, Herzberg believed that work should be designed and managed to create responsibility, achievement, growth in competence, recognition, and advancement.

[10] Problems arose when employees started resenting these repetitive tasks and the fact that they had no job security.

These factors were known as 'motivator' factors, which were intrinsic to the work itself and fostered satisfaction but could not create dissatisfaction, whereas 'hygiene' factors, such as company policies and administration, supervision, interpersonal relations, working conditions, status and security could result in job dissatisfaction but (not satisfaction/motivation) if not managed properly (Herzberg, 1966, 1976). Hackman and Oldham (2010) noted that although Herzberg's theory did not boast strong empirical backing, it was still instrumental in the creation of their fundamental Job Characteristics Theory.

The conceptual core of the JCM, however, was the pioneering expectancy theory of motivation (Porter & Lawler, 1968; Vroom, 1964). These authors believed that employees perform a job well purely because they experience a positive affect when they do well and a negative affect when they do not. This was initially a peculiar idea, as employees were always motivated by the expected outcome of performing a job well, and therefore their expectation of reward guided their efforts. This theory prompted Hackman and Oldham (1980) and Oldham and Hackman (2005) to ask the question, "What characteristics of jobs might foster that state of internal work motivation?"

2.2 THE ORIGINAL JCM

In order to fully pursue the goals of this thesis, it is first necessary to gain a full understanding of the inner workings of the JCM and the practical implications this model holds for industry. As noted earlier, it is absolutely crucial for companies today to keep employees as productive as possible. This can be done through a set of human resource interventions spearheaded by the human resources (HR) department.

The JCM attempts to explain the conditions under which employees will display motivation, satisfaction and productive behaviour. Using the JCM in conjunction with the JDS, managers are empowered to create an optimal fit between the person and the job by addressing demotivation, dissatisfaction and marginal performance related to shortcomings in the nature of the job itself (Boonzaier et al., 2001). The JCM has attracted small revisions; however, the primary structure has been kept throughout the years.

2.2.1 JOB CHARACTERISTICS

Hackman and Oldham's (1976) initial job characteristics theory built on the research of Turner and Lawrence (1965) and the work of Hackman and Lawler (1971), which concluded that the amount of variety, autonomy, identity and feedback a certain job has will lead to internal motivation (Oldham & Hackman, 2005). After these and other considerations, Hackman and Oldham settled on five core job characteristics that will lead to three critical psychological states, which in turn will prompt certain outcomes. The five key job characteristics (independent variables) are skill variety, task identity, task significance, autonomy and feedback (Hackman & Oldham, 1980). Task significance was included at a later stage, and currently forms a critical part of the model.

2.2.2 OUTCOMES

Outcomes in the model refer to organisational behaviours that employees will display if job characteristics are arranged in a certain manner. More specifically, the concept refers to the positive outcomes that will result from redesigning work. The model initially included more numerous and specific outcomes, which were formulated due to findings by Blauner (1964) and also Walker and Guest (1952). These findings indicated that how work is designed could have consequences for the emotional wellbeing of workers and therefore their likelihood to withdraw from the workplace (Oldham & Hackman, 2005). Among the outcomes are internal work motivation, quality of work performance, absenteeism and labour turnover (Hackman & Oldham, 1974, 1975, 1976). In later revisions of the model by Hackman and Oldham, quality of work performance was transformed into work effectiveness, while absenteeism and labour turnover were discarded, while a previously known moderating variable (growth satisfaction) was changed to be an outcome (as cited in Boonzaier et al., 2001). The personal and work outcomes as they currently stand therefore are internal work motivation, general job satisfaction, growth satisfaction and work effectiveness.

Hackman and Oldham (1980) used Deci's (1975) general notion of intrinsic motivation and Csikszentmihali's (1975) more focussed idea of 'flow experience' to initially conceptualise internal motivation as an outcome. They believed, however,

that Blood's (1978) notion of 'self-reward' best fitted their model, with self-administered rewards being dependent and immediate on behaviour. Hackman and Oldham (1980) then posited that, when a person is well matched with the job, he/she does not have to be coerced into doing the job well; instead, he/she would try to do well because it is internally satisfying to do so. Performing the job well/successfully is therefore regarded as a self-reward. Ultimately, the result of this self-reward process will be a self-perpetuating cycle of positive work motivation powered by self-generated (not external) rewards (Hackman & Oldham, 1980).

When a job is enriched, employees tend to be more satisfied with the job in general (Hackman & Oldham, 1980). It must be noted that the authors included this outcome as a broad term, and it did not specifically have to do with the job incumbent's satisfaction with the context of work. Therefore, designing jobs so that they had motivating potential would lead to satisfied employees.

Growth satisfaction refers to the degree to which employees are satisfied with opportunities for growth in the job (Hackman & Oldham, 1980). Here, employees have the option of growing as people, whether through the acquisition of knowledge or opportunities for advancement.

Hackman and Oldham (1980) initially proposed that productivity would be higher if jobs were higher in motivating potential. The definition of effectiveness includes two factors, namely quality and quantity. When a job is high in motivating potential, the incumbent will experience positive affect when he/she performs well, and performing well for most includes producing a quality product or service, and therefore quality is an outcome of jobs high in motivating potential. Secondly, the quantity of work would also increase. This includes producing a good or service at a faster rate than previously. It therefore is clear that, if a job is high in motivating potential, both the quality and quantity will increase, which together constitutes work effectiveness[11].

2.2.3 CRITICAL PSYCHOLOGICAL STATES

The JCM posits that all three psychological states must be present for the desirable outcomes to emerge (Kulik, Oldham & Hackman, 1987). The critical psychological

[11] Work effectiveness will be excluded from this study due to the complexity of its measurement. The outcome variables should be considered the most crucial variable class in the model.

states are built upon the work of Argyris (1964), Lawler (1969), and Porter and Lawler (1968). Firstly, skill variety, task identity and task significance jointly contribute toward the experienced meaningfulness of work. This state results if the person sees work as something in his/her own value system and sees the work as 'worthwhile'. Secondly, autonomy contributes to the experienced responsibility for work outcomes. The person must believe that he/she is accountable for the outcomes of the work. Finally, feedback contributes to the person's knowledge of results. He/she must know/understand on a continuous basis how effectively he/she is performing the job (Hackman & Oldham, 1980). The critical psychological states make up the causal core of the JCM and should fully mediate the effects of the core job characteristics and the outcomes (Hackman & Oldham, 1976, 1980).

There often is confusion around the psychological states, since the authors developed the model by identifying the psychological states important for the outcomes to emerge, then worked backwards to identify job characteristics that would elicit these states, and therefore the model is in actual fact centred around the states, and not the other way around (Johns, Xie & Fang, as cited in Behson, Eddy & Lorenzet, 2000)[12].

2.2.4 DISCUSSION AND STRUCTURAL MODEL

The final product of the work of Hackman and Oldham (1980) can be seen in Figure 2.1. It should be noted that the authors also included moderator variables, which were omitted from this model in order to pursue the objectives of this thesis. This model is one of the most widely researched models in the history of Industrial Psychology and, by the mid-1980s, it had been investigated and tested in more than 200 empirical studies (Fried & Ferris, 1987). In hindsight, Oldham and Hackman (2005) suggest reasons why they believed the model was so successful. Firstly, the issue that the model addresses, namely people and productivity, is one of the most important issues in the world of work today. Secondly, the model is easy to understand, meaning industry can clearly observe the ways in which they can enrich work and the results from it. Thirdly, the model is readily testable and applicable to almost any setting. This makes the model attractive for both scholars and industry to

[12] This fundamental confusion underpins much of the criticisms levelled against the psychological states.

test and use. Finally, the fact that the model was created with an accompanying data-gathering technique, namely the JDS, provides for efficiency in all data-gathering endeavours relating to the model and therefore invites others to test the model easily.

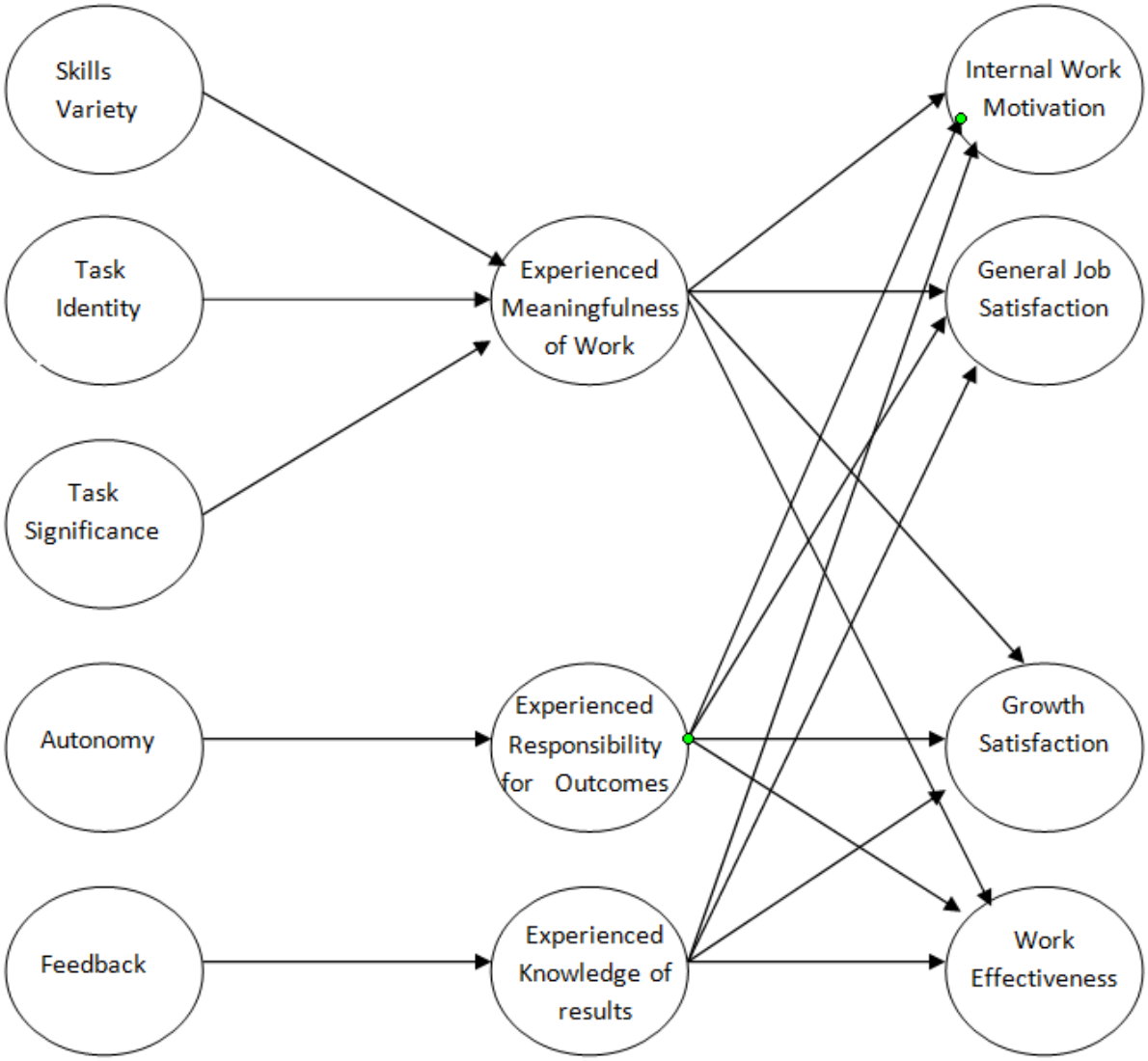

Figure 2.1 **JCM 1**[13] (Hackman & Oldham, 1980)

The model was initially designed for occupational settings only; however, it soon became apparent that it is readily applicable to a variety of other settings. Some examples include music schools (Lawrence, 2004), education (Van Dick, Schnitger, Schwartzmann-Buchelt & Wagner, 2001), hospitals (Lee-Ross, 2002) and, perhaps most interestingly, penal facilities (Mcdowall-Chittenden, 2002).

[13] This schematic portrayal excludes the moderator variables.

Debnath, Tandon and Pointer (2007) have applied the JCM to students in order to enrich MBA programmes, while Catanzaro (1997) suggests ways in which the job characteristics of university/college programmes can be enriched to be more motivating. Piccolo, Greenbaum, Den Hartog and Folger (2010) also applied the model to a student sample. In this application example, the student can be described as holding a job as he/she is completing tasks, etc., while the lecturer can be viewed as a manager overseeing and delegating (Catanzaro, 1997). This logic can furthermore be described using the independent variables of the JCM.

Firstly, students show skill variety when they utilise a range of cognitive functions in doing assignments or studying for tests. Functions such as planning, motor memory, long-term memory, critical thinking, reasoning or research are merely some of the examples. Secondly, students show high task identity when they have to do an entire assignment individually or, alternatively, when they are doing group work they experience lower task identity. The same holds true for the completion of the module in its entirety. The student must first qualify for examinations by completing a range of exercises (e.g. assignments, predicate tests or tutorials) and then pass the examination. Thirdly, students show task significance by completing their degrees and thereby having a substantial impact not only on their own lives, but on the lives of their parents and society (by receiving a degree, the person can effectively contribute to the GDP in the future). Alternatively, if the person views the process of getting a degree (doing the 'job') as a purely selfish act, he/she will show signs of low task significance. Fourthly, the individual is allowed autonomy when he/she can freely choose his/her class schedule or has the option to choose certain minor subjects (together with the major). The individual might furthermore feel a sense of autonomy if he/she is not compelled to attend lectures, but can choose to do so on the basis of free will. Lastly, students might experience a sense of feedback when assignments and examinations are scored and marks are received. The individual is essentially receiving feedback on his/her 'job' performance.

Ultimately, if courses are designed to have more motivating potential, students will experience the three psychological states, which will prompt the positive outcomes to emerge. Course satisfaction, internal motivation to study and growth satisfaction will emerge strongly in an educational setting. It therefore can be construed that a typical 'student' can be regarded as an employee, because the JCM sees him/her as

such[14]. The findings can then be used to restructure courses so that they are more enriching.

It consequently is clear that the model can be applied and tested in almost any setting and therefore holds great value. The model was truly instrumental in the work design movement and greatly served the epistemic ideal. However, this came at a price for the authors. When the JCM was becoming popular, Hackman issued a warning to Oldham:

> We're going to enjoy a good deal of acclaim, for a while, but then a backlash is sure to come. Everything about our model is going to be questioned, and we're going to take major hits (Oldham & Hackman, 2005).

2.3 SUBSEQUENT DEVELOPMENTS

The JCM quickly accumulated a body of evidence that suggested it was not as fool-proof as previously thought, and weaknesses in the model soon became apparent. Some of the important findings on the job characteristics, psychological states and outcomes will now be discussed.

2.3.1 JOB CHARACTERISTICS

Individual indicators of the extent to which each job characteristic is present in a job are provided by the JDS, together with the MPS score, being an indicator of overall job complexity, and therefore the fundamental problem arises as to which particular combination of job characteristics provides optimum representation of job complexity (Boonzaier et al., 2001).

Sims, Szilagyi and Keller (1976), Pokorney, Gilmore and Beehr (1980), Lee and Klein (1982), Harvey, Billings and Nilan (1985), and Johns, Xie and Fang (1992) found the original five-factor structure to be appropriate (as cited in Boonzaier et al., 2001). Dunham (1976) and Dunham, Aldag and Brief (1977) found mixed results with the number of appropriate structures ranging from two to four, while Fried and Ferris (1986) concluded that a three-factor solution would be most appropriate (as cited in Boonzaier et al., 2001). Ultimately these differences can be attributed to the fact that different data-gathering methods were used (JDS-R, JDS and Job

[14] Therefore the use of a student sample to empirically test a theoretical model is properly justified.

Descriptive Inventory), the nature and sizes of the samples were inconsistent, and the studies differed in their measurement of objective (as reported by individuals) and subjective job characteristics (as reported by external individuals), which makes comparison difficult (Boonzaier et al., 2001). Other reasons for these inconsistencies can perhaps be attributed to employees at different job levels understanding the complex format of the JDS items differently (Lee & Klein, 1982). Fried and Ferris (1986) corroborated this, as they found inconsistent factor structures between occupational categories.

Idaszak and Drasgow (1987) recognised the reverse-scored items within the JDS to be a major source of inconsistencies[15], and consequently created a revised version (JDS-R) of the instrument, which supported the five-factor solution (as cited in Boonzaier et al., 2001). Kulik, Oldham and Langner (1988), Cordery and Sevastos (1993), and Harvey, Billings and Nilan (1985) confirmed that the five-factor solution of the JDS-R was more appropriate, although Hackman and Oldham (1975) intentionally included the reverse-scored items to remove response bias (Boonzaier et al., 2001). In the South African context, Boonzaier and Boonzaier (1994) recommend using the revised JDS for both research and practical applications. The question remains, however: which factor solution is optimal?

2.3.2 OUTCOMES

Some of the main criticisms that were levelled against the outcomes of the model pertained specifically to the overemphasis of the model on personal outcomes (internal work motivation, general job satisfaction and growth satisfaction), rather than work outcomes (work effectiveness). It should be noted, however, that when conditions for internal work motivation are created, work effectiveness, job satisfaction and growth satisfaction may be the result (Hackman & Oldham, 1980). Some believe this overemphasis might be because productivity/performance is extremely difficult to measure (Kelly, 1992). The fact that the JDS is a self-report measure also makes a full productivity measurement difficult. O'Brien (1982) also proved that the model falls short when it comes to predicting individual productivity. Boonzaier et al. (2001) maintain that the model tends to favour the use of the personal outcomes.

[15] These developments will be discussed in depth in the measurement section.

2.3.3 CRITICAL PSYCHOLOGICAL STATES

As mentioned in Chapter 1, the role of the mediating effect of the psychological states has been questioned numerous times. Boonzaier et al. (2001) summarise the main concerns of these mediators: (1) whether the psychological states are complete mediators of the relationships between the job characteristics and outcomes; (2) whether the relationship between the job characteristics and psychological states exists as specifically prescribed by the model; and (3) whether all three states are necessary for positive outcomes to emerge.

Renn and Vandenberg found that the psychological states are only partial mediators, while Fried and Ferris (1987) and Hogan and Martell (1987) found that the inclusion of the psychological states did not increase the predictive power[16] of the JCM. Furthermore, in their review of literature on the JCM, Boonzaier et al. (2001) saw that many scholars had found that there were direct causal relationships between the job characteristics and outcomes (Algera, 1983; Boonzaier & Boonzaier, 1994; Brief & Aldag, 1975; Caldwell & O'Reilly, 1982; Champoux, 1991; Fried & Ferris, 1987; Gerhart, 1987; Hackman & Oldham, 1980; Hackman, Pearce & Wolfe, 1978; Hunt, Head & Sorensen, 1982; Lee, McCabe & Graham, 1983; Loher, Noe, Moeller & Fitzgerald, 1985; Oldham & Brass, 1979; Oldham, Hackman & Pearce, 1976; Ondrack & Evans, 1986; Orpen, 1983; Renn & Vandenberg, 1995; Roberts & Glick, 1981; Spector & Jex, 1991; Terborg & Davis, 1982; Turner & Lawrence, 1965; Wall, Clegg & Jackson, 1978).

Becherer et al. (1982) found relationships within the model that are not the same as the original authors proposed. They found that feedback successfully predicted knowledge of results; the other two states showed mixed results. The model posits that only autonomy should predict experienced responsibility; however, skill variety, task identity, task significance and feedback were just as strong predictors of experienced responsibility. Autonomy and feedback were also shown to explain some variance within the experienced meaningfulness state. Renn (1989) found that both autonomy and feedback successfully predicted their designated psychological

[16] Here, 'predictive power' refers to the model's ability to explain variance in the outcome variable class.

states, but the job characteristics predicting experienced meaningfulness did not do so successfully.

Fried and Ferris (1987) also reported confusing results. Skill variety and task significance had an overpowering relationship with experienced meaningfulness, while task identity showed the strongest relationship with experienced responsibility, and autonomy showed a strong relationship with experienced meaningfulness and responsibility (as cited in Boonzaier et al., 2001).

In their original work, Hackman and Oldham (1976) tested the mediating role of the psychological states and found that the states were better predictors of the outcomes when used as a single unit than as separate units (as cited in Boonzaier et al., 2001). Arnold and House (1987) later confirmed this. Fried and Ferris (1987), and Renn and Vandenberg (1995), found that not all three states are necessary and suggest that meaningfulness and responsibility should be morphed into one state. To their minds, this would increase the probability of the states successfully predicting the outcomes (Boonzaier et al., 2001).

2.3.4 DISCUSSION AND STRUCTURAL MODEL

A number of studies support the fact that the model is flawed in many areas, specifically in the critical psychological states. In the 21st century, research on the JCM has been declining steadily. This might be due to the fact that it seems as if the model was over-researched and too much differing findings have been reported. It is clear that in the 30-plus years the model has existed, no consensus has been reached on whether the original model is correct, or whether adaptations are the way to go. The largest support base lies in the omission of the critical psychological states (Figure 2.2). If the psychological states are indeed included, relationships between them and the job characteristics may be different to those found in the original theory (Figure 2.3). Ultimately, it is necessary to take cognisance of the fact that most of the research that was mentioned in this section was done in the 1980s and early 1990s. Since then there have been radical advances in statistical analysis techniques, which will be utilised in this study to test the validity of the proposed alternative models.

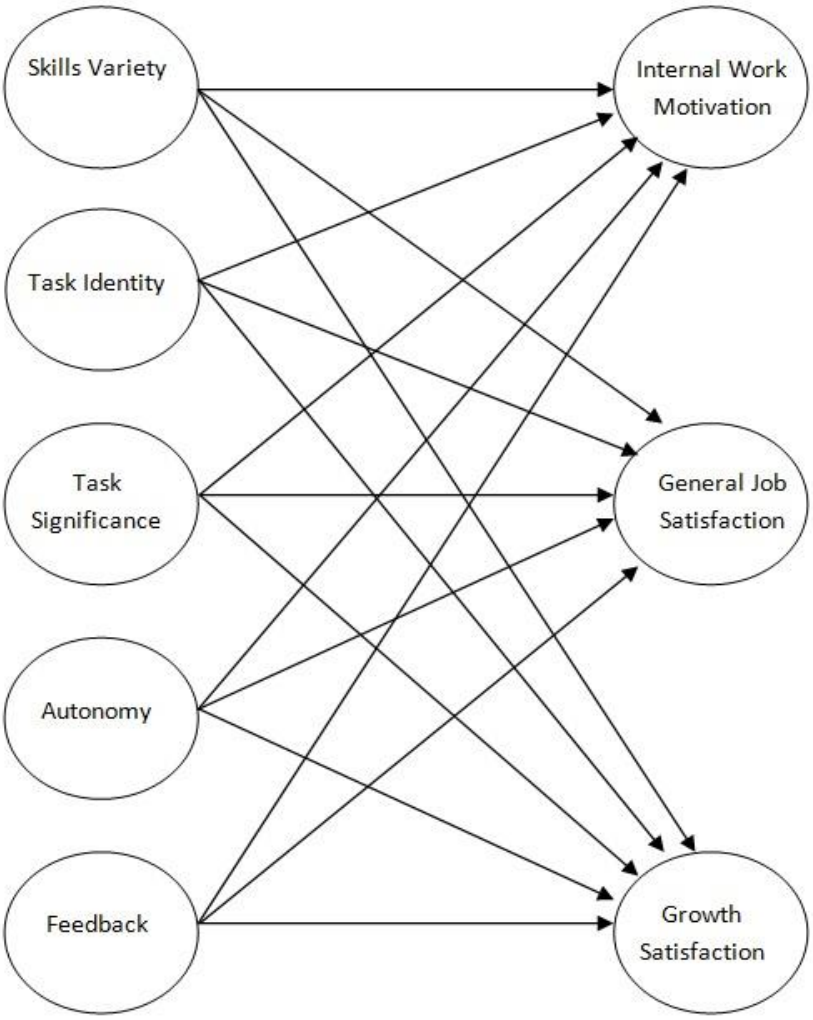

***Figure 2.2*. JCM 2**

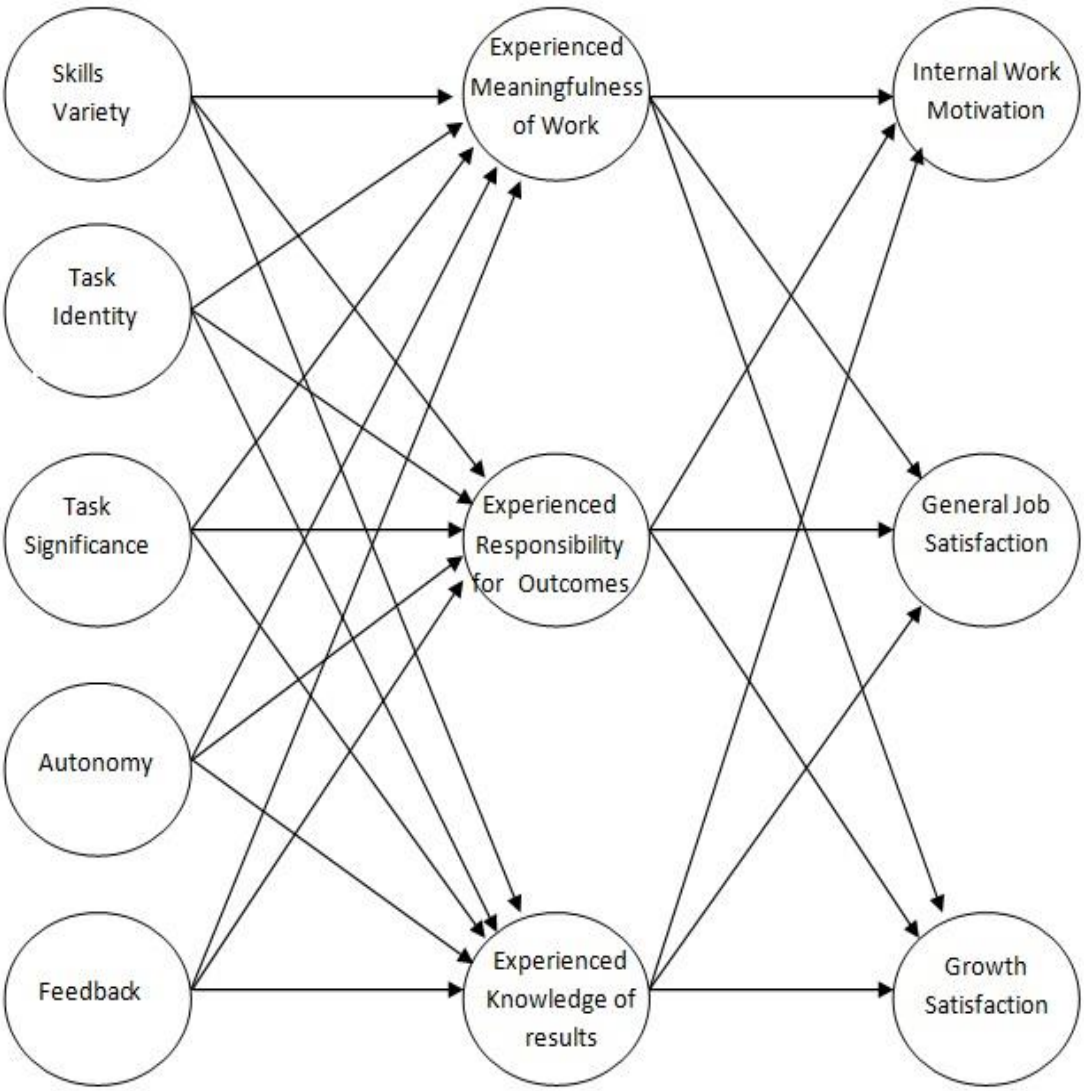

***Figure 2.3*. JCM 3**

2.4 THE PRESENT

2.4.1 STAGNATION

Industrial Psychology is currently at a critical juncture where we have to make a choice – about whether to continue adjusting and editing a model that is flawed, but also correct; a model that is a close approximation of the truth, but not close enough it would seem; a model that has played a paramount role in work design, but now seems to be overshadowed by other work design theories. Whatever the case may be, a definite answer is required. This is certainly not as easily done as said, but progress is imperative. In an overview of their work and the future of work design, Oldham and Hackman (2010, p. 465) comment:

> That was then. At the time, it made sense to focus on the job itself, since jobs were what people did at work and therefore surely also should be the core concept in research on work motivation, satisfaction, and productivity. But there have been some interesting developments in organisational life over the last few decades … The world of work is different than it was then, perhaps fundamentally so. Because it is different in ways that neither we nor others who were involved in work design research anticipated, it offers opportunities for some new directions in research and theory on work design-directions that may generate enriched understanding of human and organisational behaviour and, perhaps, suggest some non-traditional strategies for the design and leadership of work organisations.

Although the workplace has changed drastically over the past decades, the JCM still appears to hold some value for industry. It therefore is of critical importance to test the original JCM and the significant derivatives thereof once more, as proposed by this research.

2.4.2 ONCE MORE: TESTING THE JCM

This study proposes to test the validity of the original JCM (Figure 2.1) and the two major alternative models proposed in the literature, namely JCM 2 (Figure 2.2) and JCM 3 (Figure 2.3). This is achieved by combing these three models into one model. The proposed combined structural model can be seen in Figure 2.4. This model will later be separated into three distinct structural models that will be tested independently[17]. Figure 2.4 thus will serve as the departure point for the theoretical hypotheses[18]. In many of the studies previously discussed, new causal relations were found, although issues arose when no explanation for these paths were given (except in the original theory). It is important to predict logically why certain paths exist, not just state that they exist. It therefore is important to develop a valid theory for each causal path, so that if a relationship is found, there is a logical fall-back explanation of the reasoning underlying these paths.

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[17] These three models were given in Figures 2.1, 2.2 and 2.3 and henceforth will be referred to as the JCM 1 (original), JCM 2 (absent mediators) and JCM 3 (new paths).

[18] Only 39 hypotheses will be presented in this section, when there are in fact 53. This is due to the overlapping (nested) nature of the three models.

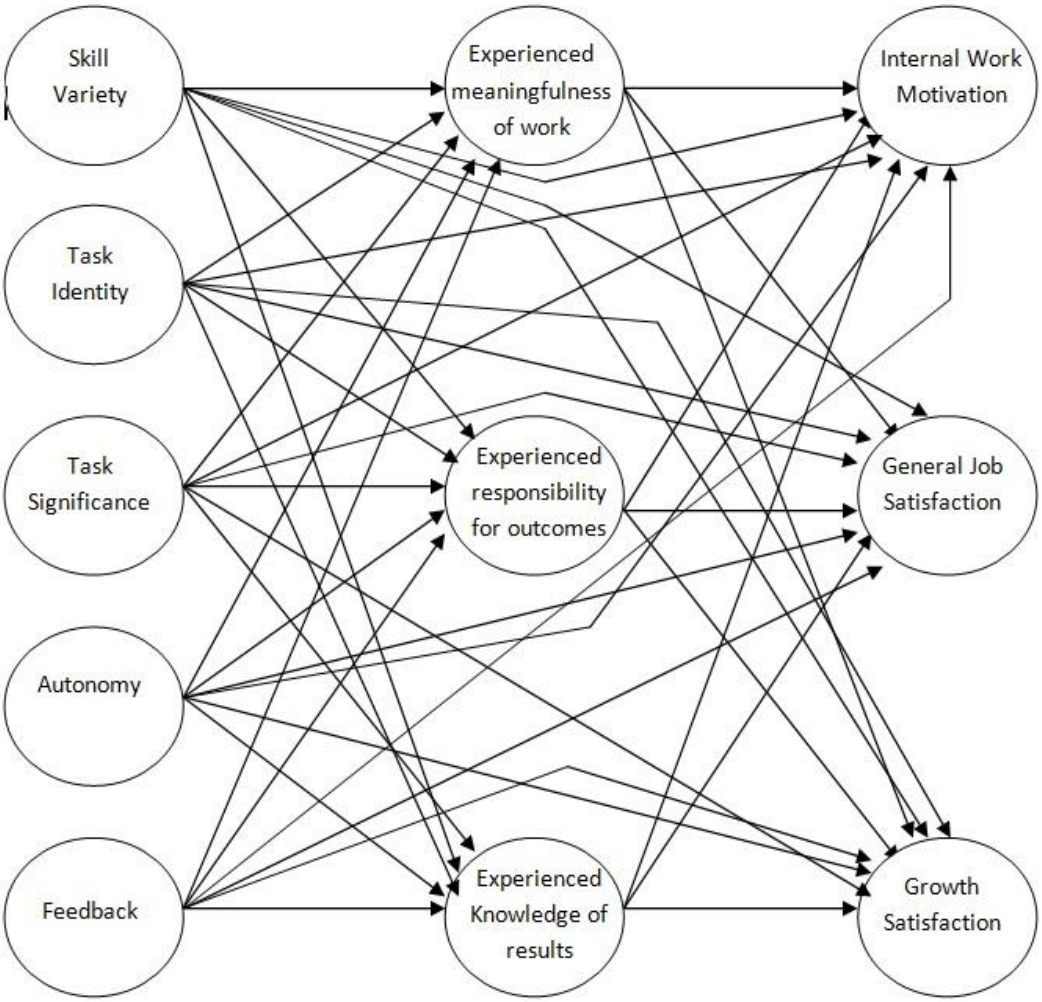


***Figure 2.4*. Combined JCM**

2.4.2.1 JOB CHARACTERISTICS AND PSYCHOLOGICAL STATES

The first set of hypotheses pertains to paths from the job characteristics to the psychological states. These include the original paths proposed, as well as new paths not previously recognised. A total of 15 paths and therefore 15 hypotheses are proposed.

When tasks are performed that stretch a person's abilities, or require a vast number of skills, a sense of meaningfulness is sure to result (Hackman & Oldham, 1980). Research has shown that individuals seek out situations to explore and manipulate their environments and gain a sense of self-efficacy by testing and using their skills (Kagan, 1972; White 1959). Therefore, by using a wide variety of skills and talents in the workplace, individuals will derive more meaning from their occupations. For

example, a mechanic fixing a car and then communicating with the client to convey the cost and what he fixed will view the work as more meaningful, as he is utilising his expertise in cars and also interpersonal skills.

Hypothesis 1: A positive causal relationship exists between skill variety and experienced meaningfulness of work.

When a job provides an individual an opportunity to use a variety of skills and talents, one can argue that the organisation is placing faith in his/her ability to utilise these skills/talents to the best of his/her abilities. The organisation is not only relying on a specific specialised skill, but on a number of perhaps untested abilities of the individual. The individual therefore feels a sense of responsibility for the outcomes of the work. For example, the mechanic who fixed the car and used his interpersonal skills not only feels responsible for the successful completion of his primary task, but also for the successful communication with the client. He therefore feels a sense of responsibility to use this skill (secondary) to as well as possible because the organisation has entrusted him to do so.

Hypothesis 2: A positive causal relationship exists between skill variety and experienced responsibility for work outcomes.

When an individual utilises all the skills and talents at his/her disposal, he/she will surely encounter more opportunities to receive feedback from others. This is because he/she utilises more skills and therefore has to liaise with more people. For example, the mechanic does not only receive feedback when the car is fixed successfully, but also from the clients who thank him and drive away in a functioning car. Therefore, by utilising more than one skill, the mechanic is receiving feedback from more than one source.

Hypothesis 3: A positive causal relationship exists between skill variety and knowledge of results.

People tend to see work as holding meaning if they can see how their job contributes to the final product. They see it as meaningful because they are aware of how their job fits in the system. This occurs when a person completes the whole product from start to finish (Hackman & Oldham, 1980). For example, a table maker who designs a table, selects the right wood, builds it and finishes it to near perfection will have high task identity. He sees the work as meaningful, since he completes the whole job by himself and can 'stamp' his name on it at the end.

Hypothesis 4: A positive causal relationship exists between task identity and experienced meaningfulness of work.

When an individual completes a job from start to finish, the organisation is placing faith in that he/she and only he/she will complete the product successfully. The individual therefore feels responsible for the outcome of the work, as it is his/her own. For example, the table maker is charged with the responsibility to complete the whole job on his own. He therefore is solely responsible for all the tasks needed for the job and also for the success of the product.

Hypothesis 5: A positive causal relationship exists between task identity and experienced responsibility for work outcomes.

By completing the job from start to finish, an individual is receiving direct information from the work as to whether the job will be successful or not (i.e. the product works and is up to standard, or not). For example, throughout the process of the table's creation, the worker can clearly see if he has glued a part on neatly or not. He can clearly see if the varnish is applied correctly, etc. At the end, the worker can see that the table is sturdy and up to standard. Therefore, by receiving information throughout the process of completing the table, the worker is getting knowledge of the results.

Hypothesis 6: A positive causal relationship exists between task identity and knowledge of results.

When people understand how their job affects the wellbeing of others, they tend to attach more meaning to it. They tend to feel that their job matters, as it invariably will have an impact on the livelihood of others. For example, a quality inspector of seatbelts at a car manufacturing plant most likely has high task significance. He experiences his job as meaningful and takes pride in it, because if he overlooks one factor it may cost someone's life. He therefore views his job as important for the safety of others and consequently attaches personal meaning to it.

Hypothesis 7: A positive causal relationship exists between task significance and experienced meaningfulness of work.

When an individual perceives his/her job to have an impact on the wellbeing of others, he/she will surely feel responsibility for completing the job successfully. For example, when the quality inspector of seatbelts overlooks one factor he could be the cause of the death of someone. He therefore is responsible for completing his job successfully.

Hypothesis 8: A positive causal relationship exists between task significance and experienced responsibility for work outcomes.

When a person understands how his/her job affects the wellbeing of others, he/she is likely to also receive feedback on how his/her performance has affected the wellbeing of others. For example, the safety belt inspector will receive feedback from statistics on car crashes. He will know if he has correctly passed a set of safety belts and allowed them to be put into cars. Therefore, because he values his job, he will move to find out these statistics if they are not communicated to him.

Hypothesis 9: A positive causal relationship exists between task significance and knowledge of results.

When an individual has ample opportunity to use his own discretion in deciding the methods to use and also the schedule for doing a job, he is in fact using his own creativity and individual way of doing the job, and therefore will derive more meaning from the job. For example, a freelance website designer can decide when he wants to do work and how he will do it. If a company hires him to design a website, he can work on it whenever he pleases, since he is working from home, and he can also use his own creativity (within the confines) to produce the website. The job therefore is personally meaningful as it is based on his own method/timing.

Hypothesis 10: A positive causal relationship exists between autonomy and experienced meaningfulness of work.

When a person views the job as giving him/her ample freedom, independence and discretion in scheduling work and determining the ways in which the work will be done, the individual feels a sense of responsibility for it. He/she feels solely responsible for their work and therefore feels that the organisation trusts him/her with the tasks given (Hackman & Oldham, 1980). For example, when the freelance website designer is given the job, he is solely responsible for creating the website, however and whenever he wants to do it.

Hypothesis 11: A positive causal relationship exists between autonomy and experienced responsibility for work outcomes.

When a person is allowed to schedule his/her own work time and decide on the method, the person will be more likely to find him/herself in situations where he/she is aware of his/her progress. For example, the freelance website designer is in a situation where he constantly can ask for others' opinions as he goes along. He can therefore choose the timing and method of how he will receive these opinions regarding the progress of the project.

Hypothesis 12: A positive causal relationship exists between autonomy and knowledge of results.

When a person receives feedback from the job or from others, he/she can clearly see how effective his/her performance is. This acknowledgement of performance will cause the individual to attach meaning to his/her performance. The fact that feedback is provided can also relate to a feeling of "I matter to this organisation". For example, a bank teller who receives feedback on her job (when a client is assisted successfully or not) will experience the job as meaningful, as it is personally gratifying to know she had just helped a client successfully. She might also receive feedback from her superior on a weekly basis. This feedback from her superior ensures her that the company cares about her performance and takes time to evaluate it. She therefore attaches meaning to her job.

Hypothesis 13: A positive causal relationship exists between feedback and experienced meaningfulness of work.

In the act of receiving feedback, the individual will immediately become aware of how important successful performance is. Therefore the responsibility of performing to a certain standard becomes clear. For example, when the bank teller cannot successfully help a client when she should have been able to, she becomes painfully aware (via job feedback) that it was in fact her responsibility to help that client. She therefore realises her responsibility to help the client.

Hypothesis 14: A positive causal relationship exists between feedback and experienced responsibility for work outcomes.

By receiving feedback on how successfully an individual does his/her work, he/she will experience an informative state of knowledge of results. The individual will be aware of his/her current performance (Hackman & Oldham, 1980). For example, when the bank teller helps a client, she receives feedback from the job (i.e. success or failure). When reviewing her performance, her superior will inform her about her strengths and weaknesses. Both the feedback from the job and from her superior give the teller knowledge of results.

Hypothesis 15: A positive causal relationship exists between feedback and knowledge of results.

2.4.2.2 JOB CHARACTERISTICS AND OUTCOMES

The second set of hypotheses tests the predictive power of the job characteristics for the outcomes if the psychological states are circumvented. A total of 15 causal paths and therefore 15 hypotheses are proposed.

As mentioned previously, humans have a need to flex their skills and use all of their talents. If an organisation allows for such exploration, individuals will be more likely to be motivated to use these skills at full capacity. For example, when the mechanic uses both his technical and interpersonal skills successfully, he will be likely to repeat this exercise (motivated to do so), since it is rewarding to use more than one skill.

Hypothesis 16: A positive causal relationship exists between skill variety and internal work motivation.

When an organisation allows for the use of various skills, individuals will satisfy their basic urges (to use not only one skill) and therefore be happier with the job. For example, by satisfying using his technical and interpersonal skills to do his job, the mechanic will experience more joy at work, as he is not only utilising his primary skill and therefore is keeping his job interesting and varied.

Hypothesis 17: A positive causal relationship exists between skill variety and general job satisfaction.

When an organisation allows the individual to use multiple skills, he/she will be tested and the opportunity will be present for the individual to explore him/herself and grow. For example, the mechanic is not only exercising and using his primary skill, but also honing other abilities. This mechanic might not be classified as a “people person”, but forced interaction makes him adept at this skill. He therefore is satisfied, since he received this opportunity to grow.

Hypothesis 18: A positive causal relationship exists between skill variety and growth satisfaction.

When an individual is able to see the end product of his/her work, and see that it was done successfully (or not), he/she will be motivated to work to maintain that same standard or if it was not successful, he/she will be motivated to work harder to achieve the correct standard. By seeing the final product, the individual therefore will be motivated internally. For example, when the table maker sees the final product and is pleased with it, he will be motivated to maintain that standard of table. On the other hand, when he sees a table with which he is not happy, he will be motivated to do better next time. Since he is completing the table from start to finish, his motivational state may be altered at each stage of production. He might say, "I shouldn't use this wood next time". Either way, the whole process will have an impact on his motivational state.

Hypothesis 19: A positive causal relationship exists between task identity and internal work motivation.

When an individual completes an entire job and can see the results of his/her work, the individual is likely to experience a state of joy when the final product of the successful job can be observed physically. For example, the table maker is happy because he completes the whole process by himself, which also allows him to physically see the progress he makes.

Hypothesis 20: A positive causal relationship exists between task identity and general job satisfaction.

When a single individual completes the whole job, the person perhaps will have the opportunity to see clearly where his/her strengths and weaknesses in the job lie. By seeing the final product, the individual is in fact 'given' the opportunity to grow in competence. For example, by completing the whole table by him, the table maker is personally growing and becoming more competent in each of the tasks required for the process. He is also becoming aware in which tasks he excels and in which not.

Hypothesis 21: A positive causal relationship exists between task identity and growth satisfaction.

When a person can observe the impact his/her work will have on the lives of others, he/she will be more likely to be motivated to improve/maintain that performance. For example, the seatbelt quality inspector knows that people's lives depend on how well he does his job. He therefore is motivated to maintain a certain standard in his inspections.

Hypothesis 22: A positive causal relationship exists between task significance and internal work motivation.

When the job has an impact on the lives of others, the individual will experience a sense of satisfaction, as he/she might feel that he/she is contributing to the wellbeing of others. For example, the seatbelt quality inspector can sleep at night knowing that he did his best to ensure the safety of car users. He therefore finds his job internally gratifying.

Hypothesis 23: A positive causal relationship exists between task significance and general job satisfaction.

When the job has an impact on the wellbeing of others, the individual will view it as personally rewarding and therefore experience personal growth. For example, the seatbelt inspector knows that lives depend on the quality of his work. He therefore will strive to do the job better every time he does it. Because people are relying on him, he is almost coerced into growing in the skills he uses.

Hypothesis 24: A positive causal relationship exists between task significance and growth satisfaction.

When a person is allowed the freedom to choose how and when the work is done, he/she will experience more internal motivation (self-discipline). The choice to work will then require more self-motivation. The fact that the organisation has entrusted the individual with this freedom also ensures that he/she will feel accountable for the outcomes of the work and therefore want to "give back". Also, when autonomy is present, there usually also is a time limit. This serves as another motivator. For example, the freelance web designer's work is highly autonomous; however, as with

any job, there is a time limit for submission of the website. The designer is motivated to complete the task required in the appointed time, and also by the fact that freedom is allowed.

Hypothesis 25: A positive causal relationship exists between autonomy and internal work motivation.

When a person is allowed the freedom to choose how and when the work is done, he/she will be more satisfied, as he/she can schedule work around how he/she is currently feeling (tired, energised, etc.). For example, in the afternoon the freelance web designer might be tired of working on the project and take a nap. He chooses to continue his work later that evening. Because the designer had the option of working when he feels physically and mentally able, he will not experience the negative feelings that occur when work is coerced or when he is not physically well. He is therefore much happier with his job in general.

Hypothesis 26: A positive causal relationship exists between autonomy and general job satisfaction.

When a person is allowed the freedom to choose how and when the work is done, he/she has the opportunity to try out new skills and experiment with working methods. This experimentation will lead to personal growth. For example, the web designer is given freedom to experiment with different designs and to choose the when to do this. In this process he is practising his skills in designing and also learning the art of self-discipline in order to finish the job in the designated time. He therefore is granted an opportunity to grow personally.

Hypothesis 27: A positive causal relationship exists between autonomy and growth satisfaction.

When an individual receives feedback on his/her performance, the individual will be more likely to know what he/she is doing successfully and what not. Therefore, the

individual will be motivated to continue this performance standard or to improve it. For example, when the bank teller notes that she cannot help the client successfully when she should have, a warning immediately sounds. She is motivated to do her best not to let this happen again. In a different scenario, she might receive positive feedback when she receives feedback from her superiors. This positive feedback will motivate her to try to maintain that performance.

Hypothesis 28: A positive causal relationship exists between feedback and internal work motivation.

When the individual receives feedback on his/her performance, he/she will be more likely to be satisfied with the job. He/she has information on what the organisation expects of him/her. If a person does not receive feedback, he/she will not know what is expected and whether the performance is up to standard. He/she therefore will be dissatisfied with the organisation's carelessness in not providing information. For example, the fact that the bank teller's superior is taking time to give her information about her performance gives her a sense of satisfaction. She feels that the organisation cares enough to provide her with this information and therefore experiences a state of satisfaction.

Hypothesis 29: A positive causal relationship exists between feedback and general job satisfaction.

When the individual receives feedback on his/her performance, he/she will know where his/her strengths and weaknesses lie. This will prompt an opportunity for improvement. For example, after receiving information about her performance, the teller now knows in which areas she excels and in which she does not. This prompts a growth process, as she not only gains self-knowledge, but can work to play to her strengths or better her weaknesses.

Hypothesis 30: A positive causal relationship exists between feedback and growth satisfaction.

2.4.2.3 CRITICAL PSYCHOLOGICAL STATES AND OUTCOMES

The third and final set of hypotheses tests the predictive power of the job characteristics on the outcomes if the psychological states are included and act as mediators. A total of nine causal paths and therefore nine hypotheses are proposed.

When work is experienced as personally meaningful (part of his/her value system), the individual will be motivated to continue doing that work successfully, as it is 'not just a job', but the work actually means more to him/her. For example, the table maker counts his work as meaningful and worthwhile. He takes pride in making a table to the best of his abilities and talents. He knows that, one day, a family will sit around that very table and experience joy. Because he attaches these meanings to his job and does not simply see the object just as a table, he will be motivated to do it again.

Hypothesis 31: A positive causal relationship exists between experienced meaningfulness of work and internal work motivation.

When work is experienced as personally meaningful (part of his/her value system), the individual will be more satisfied with the job, as it provides deeper joy than just a salary. It therefore is a pleasant experience to work for that organisation. For example, each time the mechanic fixes a car and sees a person drive off in it, he will experience the joy of knowing that it is because of him that that person has transport again. He receives great joy from this and therefore has more satisfaction with his job.

Hypothesis 32: A positive causal relationship exists between experienced meaningfulness of work and general job satisfaction.

When work is experienced as personally meaningful (part of his/her value system), the individual is likely to strive to better him/herself at every given opportunity. For example, because the safety belt inspector knows that lives depend on his work, he most likely will attempt to improve his craft at every given opportunity.

Hypothesis 33: A positive causal relationship exists between experienced meaningfulness of work and growth satisfaction.

When an individual feels personally accountable for the outcomes of work, he/she will be motivated to work to the best of his/her potential. For example, because the web designer knows that he alone is responsible for the final product, he will be more motivated to create a good website.

Hypothesis 34: A positive causal relationship exists between experienced responsibility for work outcomes and internal motivation.

When an individual feels personally accountable for the outcomes of work, he/she will be more satisfied with the job and the company as a whole, as the company has entrusted him/her with the responsibility. For example, because the table maker is solely responsible for each table he produces, it would give him greater satisfaction knowing that the job was done successfully by him.

Hypothesis 35: A positive causal relationship exists between experienced responsibility for work outcomes and general job satisfaction.

When an individual feels personally accountable for the outcomes of work, the individual will move to become a master in that work. Because he/she feels responsible for the eventual outcome of the work, he/she feels it must be to the best standard possible. For example, the freelance web designer feels personally responsible for the end product. This gives him an opportunity to create the website to the best of his abilities. In the process of doing this, the designer is becoming more skilled in his art.

Hypothesis 36: A positive causal relationship exists between experienced responsibility for work outcomes and growth satisfaction.

When an individual has information on the completed tasks' success, he/she will be more motivated to maintain or increase that performance. For example, when the bank teller knows what her work strengths and weaknesses are, she will be motivated to play to her strengths and develop her weaknesses.

Hypothesis 37: A positive causal relationship exists between knowledge of results and internal motivation.

When an individual has information on the completed tasks' success, he/she will be more satisfied as he/she has the information needed to adjust or maintain performance. Also, the fact that he/she possesses this information indicates that the company showed an interest in his/her performance. For example, after receiving feedback, the bank teller knows where her limitations and strengths lie. Work will be a much more pleasant experience for her, as she not only knows how to do her work better, but also knows that the bank has made the effort to give her information regarding her performance.

Hypothesis 38: A positive causal relationship exists between knowledge of results and general job satisfaction.

When an individual has information on the completed tasks' success, an opportunity is presented for the individual to improve or maintain performance. This also provides a personal opportunity to grow. For example, the bank teller is aware of her limitations, and now she can move to correct them.

Hypothesis 39: A positive causal relationship exists between knowledge of results and growth satisfaction.

From the literature review of the vast number of studies surrounding the JCM, these 39 hypotheses emerged together with the three models. The next step is now to plan how these hypotheses will be operationalized and also how the three models will be tested. This will be achieved by clearly spelling out the research methodology.

CHAPTER 3

RESEARCH METHODOLOGY

In the literature review, the point was made that progress regarding the JCM is paramount. It therefore is necessary to retest this model using the latest technology. It is important that the epistemic ideal of science is not threatened in this process, and it therefore is prudent to ensure that each step of the testing process uses the most applicable methodology. The probability that this study will come to a truthful verdict regarding the JCM is dependent on the methodology used. It is because of this that this section will provide a full description of the methodology utilised, and also the motivations for these choices.

3.1 JCM STRUCTURAL MODELS

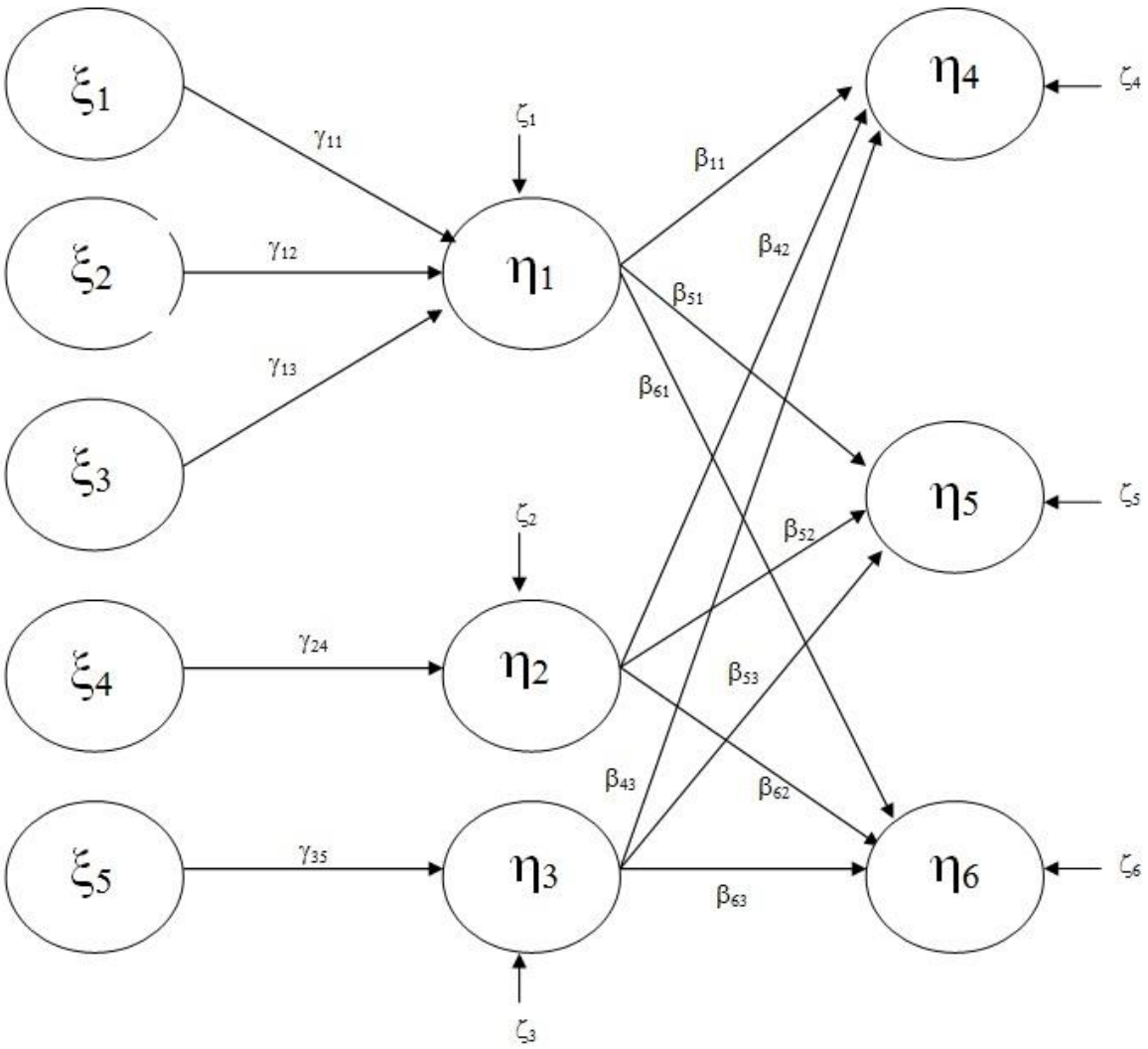


Figure 3.1. **JCM 1 (LISREL)**

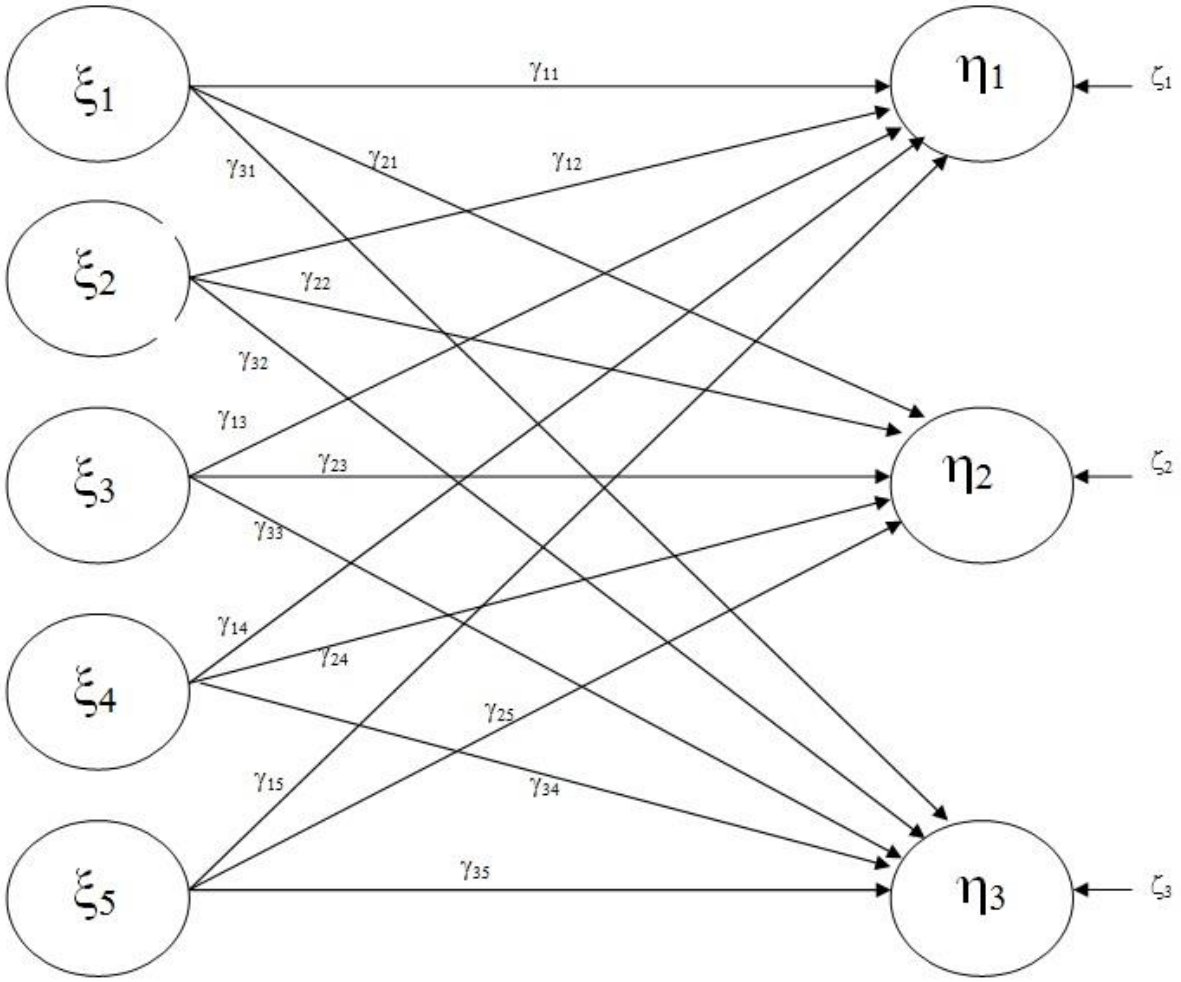


Figure 3.2. **JCM 2 (LISREL)**

The overarching objective of this thesis was to test the job characteristics model originally proposed by Hackman and Oldham (1980). The goal was to see whether the job characteristics within the model can successfully predict employee behaviour with psychological states as mediators (JCM 1). The study also aimed to test the predictive power of the job characteristics on the outcomes if the psychological states are circumvented (JCM 2). Finally, new paths from the job characteristics to the psychological states will be tested (JCM 3).

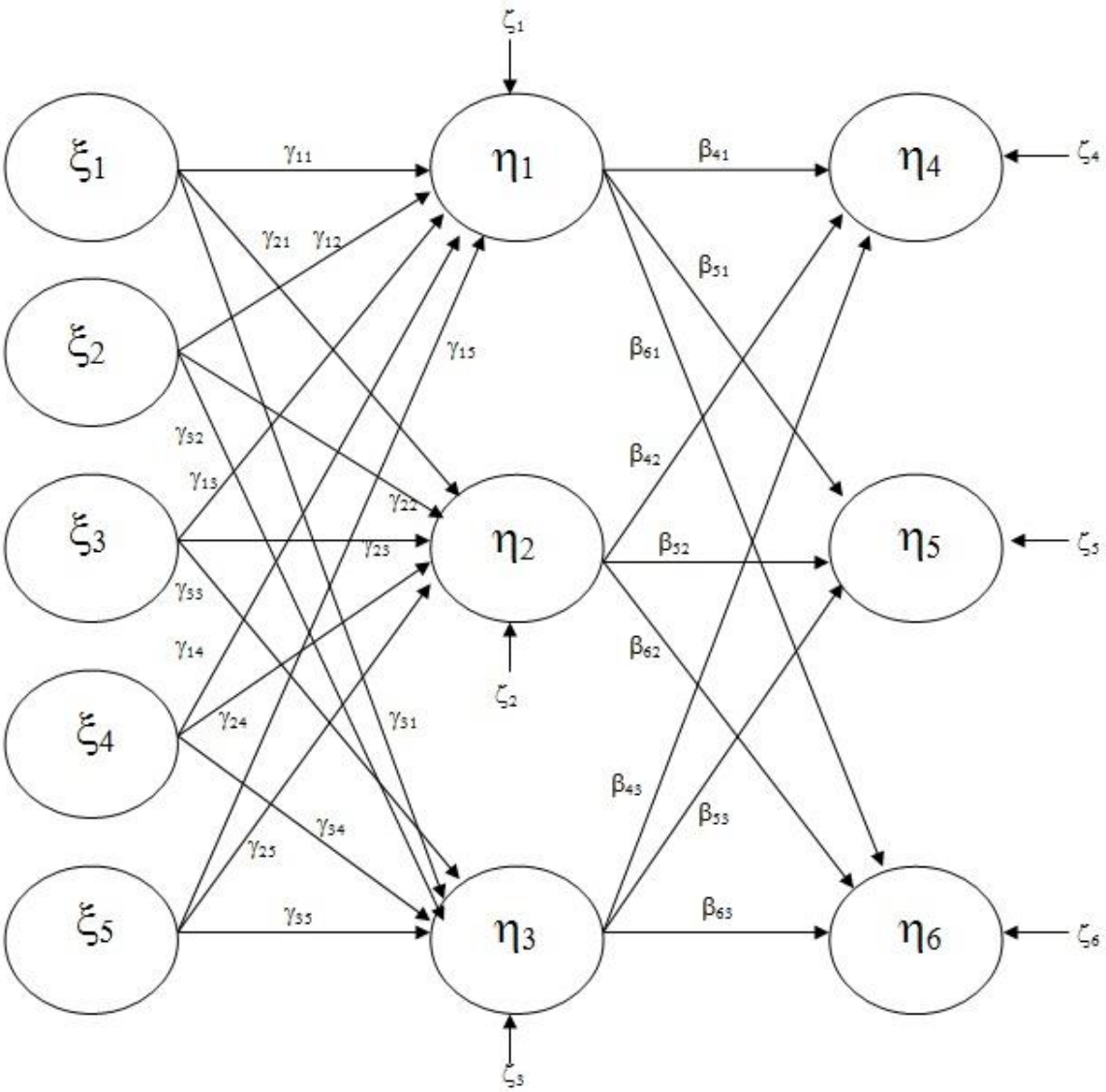


Figure 3.3. **JCM 3 (LISREL)**

The models to be tested via LISREL (Figures 3.1, 3.2 and 3.3) are depicted using the SEM LISREL conventions (Du Toit & Du Toit, 2000; Jöreskog & Sörbom, 1996b). Each of the proposed structural models can also be expressed mathematically in the form of structural equations:

JCM 1

$\eta_1 = \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \gamma_{13}\xi_3 + \zeta_1$

$\eta_2 = \gamma_{22}\xi_2 + \zeta_2$

$\eta_3 = \gamma_{35}\xi_5 + \zeta_3$

$\eta_4 = \beta_{41}\eta_1 + \beta_{42}\eta_2 + \beta_{43}\eta_3 + \zeta_4$

$\eta_5 = \beta_{51}\eta_1 + \beta_{52}\eta_2 + \beta_{53}\eta_3 + \zeta_5$

$\eta_6 = \beta_{61}\eta_1 + \beta_{62}\eta_2 + \beta_{63}\eta_3 + \zeta_6$

The structural model of JCM 1 can also be expressed in matrix form:

$$\begin{pmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ \beta_{41} & \beta_{42} & \beta_{43} & 0 & 0 & 0 \\ \beta_{51} & \beta_{52} & \beta_{53} & 0 & 0 & 0 \\ \beta_{61} & \beta_{62} & \beta_{63} & 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} \eta_1 \\ \eta_2 \\ \eta_3 \\ \eta_4 \\ \eta_5 \\ \eta_6 \end{pmatrix} + \begin{pmatrix} \gamma_{11} & \gamma_{12} & \gamma_{13} & 0 & 0 \\ 0 & \gamma_{22} & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \gamma_{35} \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} \xi_1 \\ \xi_2 \\ \xi_3 \\ \xi_4 \\ \xi_5 \end{pmatrix} + \begin{pmatrix} \zeta_1 \\ \zeta_2 \\ \zeta_3 \\ \zeta_4 \\ \zeta_5 \\ \zeta_6 \end{pmatrix}$$

The set of structural equations can be reduced to a single matrix equation:

$$\eta = B\eta + \Gamma\xi + \zeta$$

JCM 2

$\eta_1 = \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \gamma_{13}\xi_3 + \gamma_{14}\xi_4 + \gamma_{15}\xi_5 + \zeta_1$

$\eta_2 = \gamma_{21}\xi_1 + \gamma_{22}\xi_2 + \gamma_{23}\xi_3 + \gamma_{24}\xi_4 + \gamma_{25}\xi_5 + \zeta_2$

$\eta_3 = \gamma_{31}\xi_1 + \gamma_{32}\xi_2 + \gamma_{33}\xi_3 + \gamma_{34}\xi_4 + \gamma_{35}\xi_5 + \zeta_3$

The structural model of JCM 2 can also be expressed in matrix form:

$$\begin{bmatrix}\eta_1\\ \eta_2\\ \eta_3\end{bmatrix} = \begin{pmatrix}0 & 0 & 0\\ 0 & 0 & 0\\ 0 & 0 & 0\end{pmatrix}\begin{bmatrix}\eta_1\\ \eta_2\\ \eta_3\end{bmatrix} + \begin{pmatrix}\gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} & \gamma_{15}\\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} & \gamma_{25}\\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} & \gamma_{35}\end{pmatrix}\begin{bmatrix}\xi_1\\ \xi_2\\ \xi_3\\ \xi_4\\ \xi_5\end{bmatrix} + \begin{bmatrix}\zeta_1\\ \zeta_2\\ \zeta_3\end{bmatrix}$$

The set of structural equations can be reduced to a single matrix equation:

$$\eta = B\eta + \Gamma\xi + \zeta$$

<u>JCM 3</u>

$\eta_1 = \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \gamma_{13}\xi_3 + \gamma_{14}\xi_4 + \gamma_{15}\xi_5 + \zeta_1$

$\eta_2 = \gamma_{21}\xi_1 + \gamma_{22}\xi_2 + \gamma_{23}\xi_3 + \gamma_{24}\xi_4 + \gamma_{25}\xi_5 + \zeta_2$

$\eta_3 = \gamma_{31}\xi_1 + \gamma_{32}\xi_2 + \gamma_{33}\xi_3 + \gamma_{34}\xi_4 + \gamma_{35}\xi_5 + \zeta_3$

$\eta_4 = \beta_{41}\eta_1 + \beta_{42}\eta_2 + \beta_{43}\eta_3 + \zeta_4$

$\eta_5 = \beta_{51}\eta_1 + \beta_{52}\eta_2 + \beta_{53}\eta_3 + \zeta_5$

$\eta_6 = \beta_{61}\eta_1 + \beta_{62}\eta_2 + \beta_{63}\eta_3 + \zeta_6$

The structural model of JCM 3 can also be expressed in matrix form:

$$\begin{pmatrix}\eta_1\\ \eta_2\\ \eta_3\\ \eta_4\\ \eta_5\\ \eta_6\end{pmatrix} = \begin{pmatrix}0 & 0 & 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0 & 0 & 0\\ \beta_{41} & \beta_{42} & \beta_{43} & 0 & 0 & 0\\ \beta_{51} & \beta_{52} & \beta_{53} & 0 & 0 & 0\\ \beta_{61} & \beta_{62} & \beta_{63} & 0 & 0 & 0\end{pmatrix}\begin{pmatrix}\eta_1\\ \eta_2\\ \eta_3\\ \eta_4\\ \eta_5\\ \eta_6\end{pmatrix} + \begin{pmatrix}\gamma_{11} & \gamma_{12} & \gamma_{13} & \gamma_{14} & \gamma_{15}\\ \gamma_{21} & \gamma_{22} & \gamma_{23} & \gamma_{24} & \gamma_{25}\\ \gamma_{31} & \gamma_{32} & \gamma_{33} & \gamma_{34} & \gamma_{35}\\ 0 & 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0 & 0\end{pmatrix}\begin{pmatrix}\xi_1\\ \xi_2\\ \xi_3\\ \xi_4\\ \xi_5\end{pmatrix} + \begin{pmatrix}\zeta_1\\ \zeta_2\\ \zeta_3\\ \zeta_4\\ \zeta_5\\ \zeta_6\end{pmatrix}$$

The set of structural equations can be reduced to a single matrix equation:

$$\eta = B\eta + \Gamma\xi + \zeta$$

3.2 SUBSTANTIVE RESEARCH HYPOTHESES

The overarching substantive research hypothesis is that the JCM provides a valid explanation of the behaviours (outcomes) that would result if jobs are designed (job characteristics) in a particular manner. This main hypothesis can be distilled into 53[19] more specific and detailed substantive research hypotheses[20].

JCM 1:

Hypothesis 1: A direct linear relationship exists between *skill variety* (ξ_1) and *experienced meaningfulness of work* (η_1).

Hypothesis 2: A direct linear relationship exists between *task identity* (ξ_2) and *experienced meaningfulness of work* (η_1).

Hypothesis 3: A direct linear relationship exists between *task significance* (ξ_3) and *experienced meaningfulness of work* (η_1).

Hypothesis 4: A direct linear relationship exists between *autonomy* (ξ_4) and *experienced responsibility for work outcomes* (η_2).

Hypothesis 5: A direct linear relationship exists between *feedback* (ξ_5) and *knowledge of results* (η_3).

Hypothesis 6: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *internal work motivation* (η_4).

Hypothesis 7: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *general job satisfaction* (η_5).

Hypothesis 8: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *growth satisfaction* (η_6).

Hypothesis 9: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *internal motivation* (η_4).

---

[19] As noted earlier, only 39 theoretical hypotheses exist; however, there are 53 testable hypotheses due to the overlapping nature of the models. The hypotheses consequently were rearranged differently than the arrangement in Chapter Two.

[20] These hypotheses are categorised according to the model that is tested.

Hypothesis 10: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *general job satisfaction* (η_5).

Hypothesis 11: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *growth satisfaction* (η_6)

Hypothesis 12: A direct linear relationship exists between *knowledge of results* (η_3) *and internal motivation* (η_4).

Hypothesis 13: A direct linear relationship exists between *knowledge of results* (η_3) and *general job satisfaction* (η_5).

Hypothesis 14: A direct linear relationship exists between *knowledge of results* (η_3) and *growth satisfaction* (η_6).

JCM 2

Hypothesis 15: A direct linear relationship exists between *skill variety* (ξ_1) and *internal work motivation* (η_1).

Hypothesis 16: A direct linear relationship exists between *skill variety* (ξ_1) and *general job satisfaction* (η_2).

Hypothesis 17: A direct linear relationship exists between *skill variety* (ξ_1) and *growth satisfaction* (η_3).

Hypothesis 18: A direct linear relationship exists between *task identity* (ξ_2) and *internal work motivation* (η_1)

Hypothesis 19: A direct linear relationship exists between *task identity* (ξ_2) and *general job satisfaction* (η_2).

Hypothesis 20: A direct linear relationship exists between *task identity* (ξ_2) and *growth satisfaction* (η_3).

Hypothesis 21: A direct linear relationship exists between *task significance* (ξ_3) and *internal work motivation* (η_1).

Hypothesis 22: A direct linear relationship exists between *task significance* (ξ_3) and *general job satisfaction* (η_2).

Hypothesis 23: A direct linear relationship exists between *task significance* (ξ_3) and *growth satisfaction* (η_3).

Hypothesis 24: A direct linear relationship exists between *autonomy* (ξ_4) and *internal work motivation* (η_1).

Hypothesis 25: A direct linear relationship exists between *autonomy* (ξ_4) and *general job satisfaction* (η_2).

Hypothesis 26: A direct linear relationship exists between *autonomy* (ξ_4) and *growth satisfaction* (η_3).

Hypothesis 27: A direct linear relationship exists between *feedback* (ξ_5) and *internal work motivation* (η_1).

Hypothesis 28: A direct linear relationship exists between *feedback* (ξ_5) and *general job satisfaction* (η_2).

Hypothesis 29: A direct linear relationship exists between *feedback* (ξ_5) and *growth satisfaction* (η_3).

JCM 3

Hypothesis 30: A direct linear relationship exists between *skill variety* (ξ_1) and *experienced meaningfulness of work* (η_1).

Hypothesis 31: A direct linear relationship exists between *skill variety* (ξ_1) and *experienced responsibility for work outcomes* (η_2).

Hypothesis 32: A direct linear relationship exists between *skill variety* (ξ_1) and *knowledge of results* (η_3).

Hypothesis 33: A direct linear relationship exists between *task identity* (ξ_2) and *experienced meaningfulness of work* (η_1).

Hypothesis 34: A direct linear relationship exists between *task identity* (ξ_2) and *experienced responsibility for work outcomes* (η_2).

Hypothesis 35: A direct linear relationship exists between *task identity* (ξ_2) and *knowledge of results* (η_3).

Hypothesis 36: A direct linear relationship exists between *task significance* (ξ_3) and *experienced meaningfulness of work* (η_1).

Hypothesis 37: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *internal work motivation* (η_4).

Hypothesis 38: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *general job satisfaction* (η_5).

Hypothesis 39: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *growth satisfaction* (η_6).

Hypothesis 40: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *internal motivation* (η_4).

Hypothesis 41: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *general job satisfaction* (η_5).

Hypothesis 42: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *growth satisfaction* (η_6)

Hypothesis 43: A direct linear relationship exists between *knowledge of results* (η_3) *and internal motivation* (η_4).

Hypothesis 44: A direct linear relationship exists between *knowledge of results* (η_3) and *general job satisfaction* (η_5).

Hypothesis 45: A direct linear relationship exists between *knowledge of results* (η_3) and *growth satisfaction* (η_6).

Hypothesis 46: A direct linear relationship exists between *task significance* (ξ_3) and *experienced responsibility for work outcomes* (η_2).

Hypothesis 47: A direct linear relationship exists between *task significance* (ξ_3) and *knowledge of results* (η_3).

Hypothesis 48: A direct linear relationship exists between *autonomy* (ξ_4) and *experienced meaningfulness of work* (η_1).

Hypothesis 49: A direct linear relationship exists between *autonomy* (ξ_4) and *experienced responsibility for work outcomes* (η_2).

Hypothesis 50: A direct linear relationship exists between *autonomy* (ξ_4) and *knowledge of results* (η_3).

Hypothesis 51: A direct linear relationship exists between *feedback* (ξ_5) and *experienced meaningfulness of work* (η_1).

Hypothesis 52: A direct linear relationship exists between *feedback* (ξ_5) and *experienced responsibility for work outcomes* (η_2).

Hypothesis 53: A direct linear relationship exists between *feedback* (ξ_5) and *knowledge of results* (η_3).

3.3 RESEARCH DESIGN

The method/plan through which the validity of the research hypotheses will be tested is known as the research design (Kerlinger & Lee, 2000). The function of the research design is to control variance so that findings can be interpreted unambiguously (Babbie & Mouton, 2001; Theron, 2012). Therefore, in order to arrive at a valid explanation on the JCM, it is necessary to use the most appropriate research design as vehicle.

There are four broad research designs, but the most applicable design in this case would be an ex post facto correlational design. This is because there is an absence of experimental manipulation of the exogenous latent variables, no random assignment, and levels of the ksi's are observed through measurement (but participants are not grouped into treatments based on the observed levels of ksi) (Babbie & Mouton, 2001; Theron, 2012).

Following a basic research design rule of thumb (Babbie & Mouton, 2001; Theron, 2012), if a structural model contains more than two eta's that are affected by more than two ksi's, causal relationships exist between the endogenous latent variables, and if the ksi's cannot be manipulated experimentally, then an ex post facto correlational design is most appropriate. This design, with at least two indicator variables per latent variable, must be used and tested using structural equation modelling[21] (Babbie & Mouton, 2001; Theron, 2012). The research designs for all three of the structural models are therefore ex post facto correlational and can be expressed as follows:

JCM 1 and 3

X_{11}	X_{21}	.....	$X_{10,1}$	Y_{11}	Y_{21}	Y_{31}	.....	$Y_{14,1}$
X_{12}	X_{22}	.....	$X_{10,2}$	Y_{12}	Y_{22}	Y_{32}	.....	$Y_{14,2}$
X_{13}	X_{23}	.....	$X_{10,3}$	Y_{13}	Y_{23}	Y_{33}	.....	$Y_{14,3}$
.....	.....	.....	.....	.....	.....	.....	.....	.....
X_{1i}	X_{2i}	.....	X_{10i}	Y_{1i}	Y_{2i}	Y_{3i}	.....	Y_{14i}
.....	.....	.....	.....	.....	.....	.....	.....	.....
X_{1n}	X_{2n}	.....	X_{10n}	Y_{1n}	Y_{2n}	Y_{3n}	.....	Y_{14n}

JCM 2

X_{11}	X_{21}	.....	$X_{10,1}$	Y_{11}	Y_{21}	Y_{31}	.....	Y_{71}
X_{12}	X_{22}	.....	$X_{10,2}$	Y_{12}	Y_{22}	Y_{32}	.....	Y_{72}
X_{13}	X_{23}	.....	$X_{10,3}$	Y_{13}	Y_{23}	Y_{33}	.....	Y_{73}
.....	.....	.....	.....	.....	.....	.....	.....	.....
X_{1i}	X_{2i}	.....	X_{10i}	Y_{1i}	Y_{2i}	Y_{3i}	.....	Y_{7i}
.....	.....	.....	.....	.....	.....	.....	.....	.....
X_{1n}	X_{2n}	.....	X_{10n}	Y_{1n}	Y_{2n}	Y_{3n}	.....	Y_{7n}

[21] In this design, each latent variable is represented by only two indicator variables to simplify the schematic portrayal. In actual fact, there are variations in the indicators for each latent variable.

There is a careful, specific logic underlying the use of this design. Through this design, measures will be obtained on the observed variables, and the observed covariance will be calculated (Kerlinger & Lee, 2000). Estimates for the freed structural and measurement model parameters will be obtained in an iterative manner in order to reproduce the observed covariance matrix as closely as possible (Diamantopoulos & Siguaw, 2000). If the fitted model fails to accurately produce the covariance matrix, it can be inferred that the structural model does not provide a reasonable explanation for the observed covariance matrix (Diamantopoulos & Siguaw, 2000; Kelloway, 1998). It then can be assumed that the relationships hypothesised by the model do not provide an accurate portrayal of behaviour resulting from job design. However, if the covariance matrix derived from the estimated structural and measurement model parameters agrees with the observed covariance matrix, it cannot be assumed that the hypotheses made by the structural model produced the observed covariance matrix. It therefore cannot be concluded that the relationships in the structural model produced the levels of the endogenous latent variables. A high degree of fit between the observed and estimated covariance matrices consequently would imply that the psychological mechanisms depicted by the structural model provide only one plausible explanation for the observed covariance matrix (Babbie & Mouton, 2001; Smuts, 2011; Theron, 2012).

There are risk areas in using an ex post facto correlational design, namely the lack of power to randomise, the risk of incorrect interpretation of the results, and the inability to manipulate the independent variables (Kerlinger & Lee, 2000). Comparing ex post facto designs to classical experimental designs, they lack control and erroneous interpretations may occur due to the possibility of more than one explanation for the obtained correlation. This is risky when no clear theoretical explanations are provided[22] (Kerlinger & Lee, 2000). Furthermore, with a correlational design, the internal validity is also low (Babbie & Mouton, 2001). These risk areas will be taken into account when testing the JCM.

[22] This is not true for the present study, however, as valid explanations were provided for each possible relationship in the literature review.

3.4 STATISTICAL HYPOTHESES

The type of research design that will be used, together with the method of statistical investigation, will determine the format of the statistical hypotheses. As per the argumentation provided in the previous section, the most appropriate method for this study will be structural equation modelling via an ex post facto correlation design. The statistical hypotheses therefore will be formulated using LISREL conventions (Du Toit & Du Toit, 2001; Jöreskog & Sörbom, 1996b).

The overarching substantive research hypothesis claims that the JCM provides a valid explanation of how characteristics of a job may result in certain behaviours in employees. Under ideal circumstances, the JCM would predict behaviour perfectly, which means that the model is a perfect explanation of the truth. An exact fit hypothesis is proposed[23]:

$^{a}H_{01}$: RMSEA = 0	$^{b}H_{02}$: RMSEA = 0	$^{c}H_{03}$: RMSEA = 0
$^{a}H_{a1}$: RMSEA > 0	$^{b}H_{a2}$: RMSEA > 0	$^{c}H_{a3}$: RMSEA > 0

However, the possibility of perfectly explaining a specific phenomenon in nature is very small. It then can be inferred that a near approximation of the truth will be the next best thing. If the JCM explains behaviour via the job characteristics, but does not do so perfectly, it can be regarded as a close fit. A close fit hypothesis is therefore proposed:

$^{a}H_{04}$: RMSEA ≤ 0.05	$^{b}H_{05}$: RMSEA ≤ 0.05	$^{c}H_{06}$: RMSEA ≤ 0.05
$^{a}H_{a4}$: RMSEA > 0.05	$^{b}H_{a5}$: RMSEA > 0.05	$^{c}H_{a6}$: RMSEA > 0.05

The overarching substantive research hypothesis can be dissected further into another 53 more detailed hypotheses. These hypotheses will aim to test the strength of causal interactions within the JCM. The path coefficient hypotheses can be seen in Table 4[24].

[23] [a]JCM 1; [b]JCM 2 and [c]JCM 3

[24] Once more the hypotheses are rearranged, with the addition of the exact and close fit hypotheses totalling 59 hypotheses. This is the final hypothesis structure.

Table 3.1

Path Coefficient Hypotheses

${}^{a}H_{07}$: $\gamma_{11} = 0$ ${}^{a}H_{a7}$: $\gamma_{11} > 0$	${}^{a}H_{08}$: $\gamma_{12} = 0$ ${}^{a}H_{a8}$: $\gamma_{12} > 0$	${}^{a}H_{09}$: $\gamma_{13} = 0$ ${}^{a}H_{a9}$: $\gamma_{13} > 0$	${}^{a}H_{010}$: $\gamma_{24} = 0$ ${}^{a}H_{a10}$: $\gamma_{24} > 0$
${}^{a}H_{011}$: $\gamma_{35} = 0$ ${}^{a}H_{a11}$: $\gamma_{35} > 0$	${}^{a}H_{012}$: $\beta_{41} = 0$ ${}^{a}H_{a12}$: $\beta_{41} > 0$	${}^{a}H_{013}$: $\beta_{51} = 0$ ${}^{a}H_{a13}$: $\beta_{51} > 0$	${}^{a}H_{014}$: $\beta_{61} = 0$ ${}^{a}H_{a14}$: $\beta_{61} > 0$
${}^{a}H_{015}$: $\beta_{42} = 0$ ${}^{a}H_{a15}$: $\beta_{42} > 0$	${}^{a}H_{016}$: $\beta_{52} = 0$ ${}^{a}H_{a16}$: $\beta_{52} > 0$	${}^{a}H_{017}$: $\beta_{62} = 0$ ${}^{a}H_{a17}$: $\beta_{62} > 0$	${}^{a}H_{018}$: $\beta_{43} = 0$ ${}^{a}H_{a18}$: $\beta_{43} > 0$
${}^{a}H_{019}$: $\beta_{53} = 0$ ${}^{a}H_{a19}$: $\beta_{53} > 0$	${}^{a}H_{020}$: $\beta_{63} = 0$ ${}^{a}H_{a20}$: $\beta_{63} > 0$	${}^{b}H_{021}$: $\gamma_{11} = 0$ ${}^{b}H_{a21}$ $\gamma_{11} > 0$	${}^{b}H_{022}$: $\gamma_{21} = 0$ ${}^{b}H_{a22}$: $\gamma_{21} > 0$
${}^{b}H_{023}$: $\gamma_{31} = 0$ ${}^{b}H_{a23}$: $\gamma_{31} > 0$	${}^{b}H_{024}$: $\gamma_{12} = 0$ ${}^{b}H_{a24}$: $\gamma_{12} > 0$	${}^{b}H_{025}$: $\gamma_{22} = 0$ ${}^{b}H_{a25}$: $\gamma_{22} > 0$	${}^{b}H_{026}$: $\gamma_{32} = 0$ ${}^{b}H_{a26}$: $\gamma_{32} > 0$
${}^{b}H_{027}$: $\gamma_{13} = 0$ ${}^{b}H_{a27}$: $\gamma_{13} > 0$	${}^{b}H_{028}$: $\gamma_{23} = 0$ ${}^{b}H_{a28}$: $\gamma_{23} > 0$	${}^{b}H_{029}$: $\gamma_{33} = 0$ ${}^{b}H_{a29}$: $\gamma_{33} > 0$	${}^{b}H_{030}$: $\gamma_{14} = 0$ ${}^{b}H_{a30}$: $\gamma_{14} > 0$
${}^{b}H_{031}$: $\gamma_{24} = 0$ ${}^{b}H_{a31}$: $\gamma_{24} > 0$	${}^{b}H_{032}$: $\gamma_{34} = 0$ ${}^{b}H_{a32}$: $\gamma_{34} > 0$	${}^{b}H_{033}$: $\gamma_{15} = 0$ ${}^{b}H_{a33}$: $\gamma_{15} > 0$	${}^{b}H_{034}$: $\gamma_{25} = 0$ ${}^{b}H_{a34}$: $\gamma_{25} > 0$
${}^{b}H_{035}$: $\gamma_{35} = 0$ ${}^{b}H_{a35}$: $\gamma_{35} > 0$	${}^{c}H_{036}$: $\gamma_{11} = 0$ ${}^{c}H_{a36}$ $\gamma_{11} > 0$	${}^{c}H_{037}$: $\gamma_{21} = 0$ ${}^{c}H_{a37}$ $\gamma_{21} > 0$	${}^{c}H_{038}$: $\gamma_{31} = 0$ ${}^{c}H_{a38}$ $\gamma_{31} > 0$
${}^{c}H_{039}$: $\gamma_{12} = 0$ ${}^{c}H_{a39}$ $\gamma_{12} > 0$	${}^{c}H_{040}$: $\gamma_{22} = 0$ ${}^{c}H_{a40}$ $\gamma_{22} > 0$	${}^{c}H_{041}$: $\gamma_{32} = 0$ ${}^{c}H_{a41}$ $\gamma_{32} > 0$	${}^{c}H_{042}$: $\gamma_{13} = 0$ ${}^{c}H_{a42}$ $\gamma_{13} > 0$
${}^{c}H_{043}$: $\gamma_{23} = 0$ ${}^{c}H_{a43}$ $\gamma_{23} > 0$	${}^{c}H_{044}$: $\gamma_{33} = 0$ ${}^{c}H_{a44}$ $\gamma_{33} > 0$	${}^{c}H_{045}$: $\gamma_{14} = 0$ ${}^{c}H_{a45}$ $\gamma_{14} > 0$	${}^{c}H_{046}$: $\gamma_{24} = 0$ ${}^{c}H_{a46}$ $\gamma_{24} > 0$
${}^{c}H_{047}$: $\gamma_{34} = 0$ ${}^{c}H_{a47}$ $\gamma_{34} > 0$	${}^{c}H_{048}$: $\gamma_{15} = 0$ ${}^{c}H_{a48}$ $\gamma_{15} > 0$	${}^{c}H_{049}$: $\gamma_{25} = 0$ ${}^{c}H_{a49}$ $\gamma_{25} > 0$	${}^{c}H_{050}$: $\gamma_{35} = 0$ ${}^{c}H_{a50}$ $\gamma_{35} > 0$
${}^{c}H_{051}$: $\beta_{41} = 0$ ${}^{c}H_{a51}$: $\beta_{41} > 0$	${}^{c}H_{052}$: $\beta_{51} = 0$ ${}^{c}H_{a52}$: $\beta_{51} > 0$	${}^{c}H_{053}$: $\beta_{61} = 0$ ${}^{c}H_{a53}$: $\beta_{61} > 0$	${}^{c}H_{054}$: $\beta_{42} = 0$ ${}^{c}H_{a54}$: $\beta_{42} > 0$
${}^{c}H_{055}$: $\beta_{52} = 0$ ${}^{c}H_{a55}$: $\beta_{52} > 0$	${}^{c}H_{056}$: $\beta_{62} = 0$ ${}^{c}H_{a56}$: $\beta_{62} > 0$	${}^{c}H_{057}$: $\beta_{43} = 0$ ${}^{c}H_{a57}$: $\beta_{43} > 0$	${}^{c}H_{058}$: $\beta_{53} = 0$ ${}^{c}H_{a58}$: $\beta_{53} > 0$
${}^{c}H_{059}$: $\beta_{63} = 0$ ${}^{c}H_{a59}$: $\beta_{63} > 0$			

3.5 SAMPLE

The extent to which generalisations are made regarding a certain population is a function of the number of subjects chosen from a population and the representativeness of that sample, which moreover influences the power of a given statistical method (Elmes, Kantowitz & Roediger, 1999).

Kelloway (1998) suggests that sample sizes of 200+ are sufficient for most SEM studies. However, three considerations will be included when choosing the size of the sample which are of critical importance because SEM will be used (Theron, 2012). The first consideration is the ratio of the sample size to the number of parameters to be estimated (Theron, 2012). It is acceptable if a study presents more freed parameters that have to be estimated than there are observations (Theron, 2012). Elaborate measurement and structural models, such as the fully mediated JCM, contain more variables and therefore have more freed parameters that have to be estimated. These models require larger sample sizes. Bentler and Chou (as cited in Kelloway, 1998) recommend that the sample size to estimated parameter ratio should fall between 5:1 and 10:1[25].

Secondly, the statistical power associated with the test of the hypothesis of close fit, against an alternative hypothesis of mediocre fit, must also be considered (Theron, 2012). In SEM, statistical power refers to the probability of correctly rejecting the close fit hypothesis. Excessively high statistical power would mean that any attempt to corroborate the validity of the model formally and empirically would be futile (Burger, 2011). Excessively low power, on the other hand, would mean that even if the model fails to fit closely, the close fit null hypothesis would still not be rejected, and consequently, not rejecting the close fit under conditions of low power therefore will not provide very convincing evidence on the validity of the model (Burger, 2011). Power tables were compiled by MacCallum, Browne and Sugawara (1996). These tables are used to derive sample-size estimates for the test of close fit and give a significance level (α) of 0,05, a power level of 0,80 and degrees of freedom (v).

Lastly, the practical and logical considerations like cost, and the availability of suitable respondents, were also considered (Theron, 2012). Taking into account the

[25] Freed parameters: JCM 1 = 72, JCM 2 = 59 and JCM 3 = 82

abovementioned considerations, the sample size for this study was decided to be a minimum of approximately 410 observations.

The population from which data was gathered was primarily undergraduate students at Stellenbosch University. Data was gathered using an internet-based survey. The sample was reached via emails sent to individuals studying BComm, BEng, BSc and BA. The average age of the subjects ranged from 18 to 24 years. The investigation utilised non-probability sampling (convenience sampling).

Informed consent was obtained from all of the research participants. Permission was also obtained from Stellenbosch University to conduct the study. The total sample reached was 881 observations. Figure 3.4 shows the sample profile in terms of age. The median age of the subjects was 21, with a mean age of 20.63.

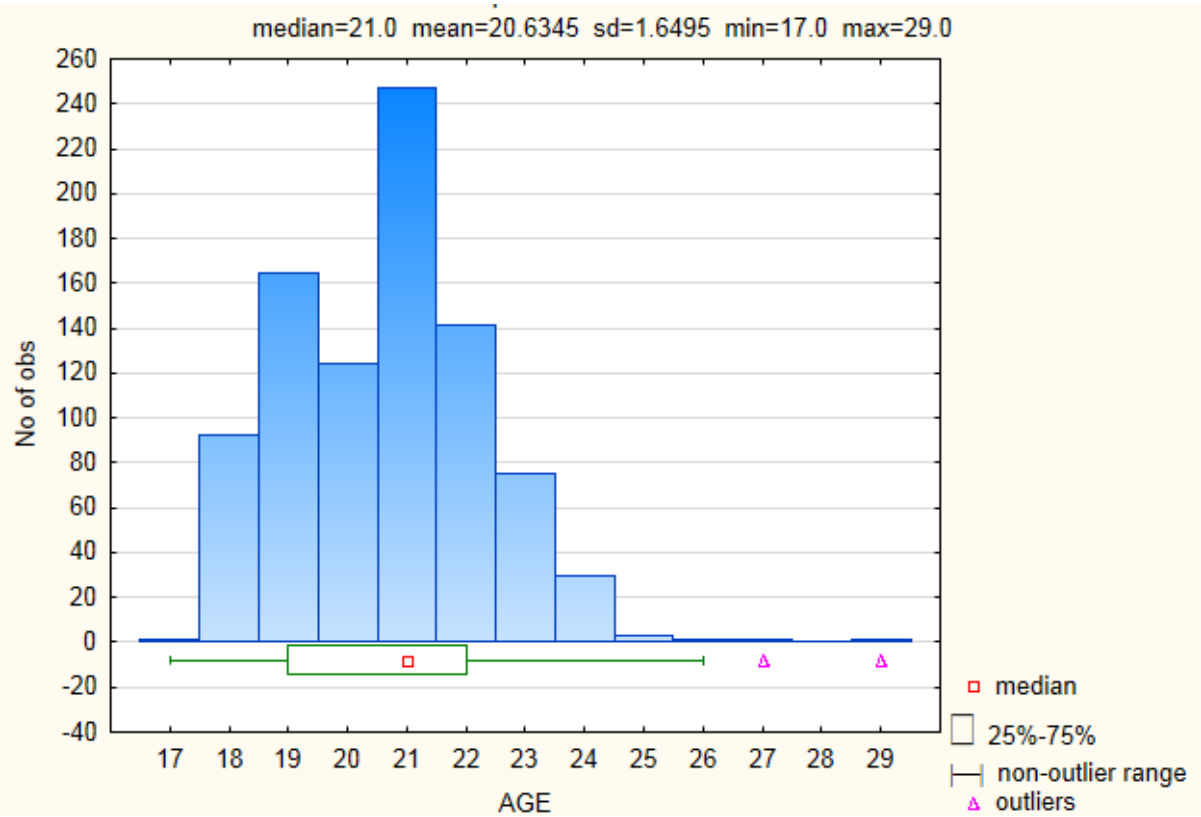


***Figure 3.4*. Histogram of age**

Figure 3.5 shows the sample profile in terms of degree being studied. The greatest number of participants were studying for a BA degree (36%), with the smallest number studying for BComm and BSc degrees (20% each).

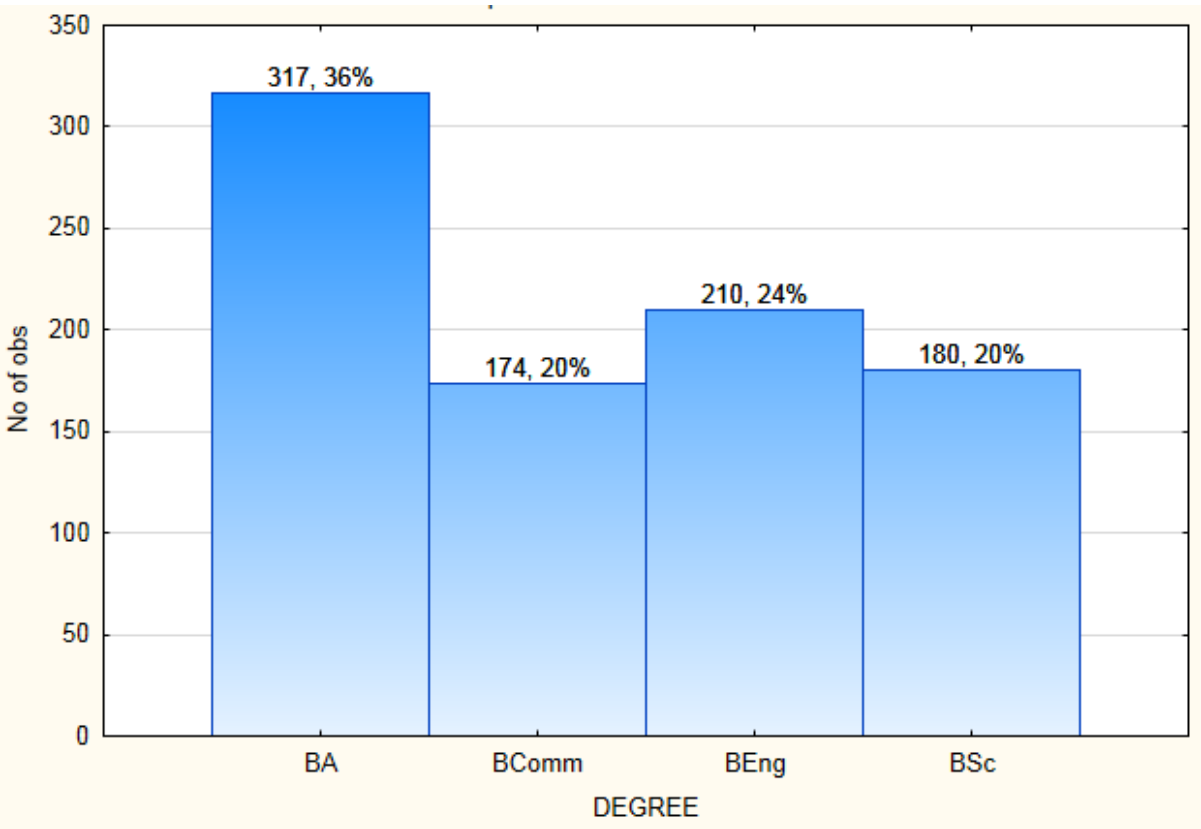


***Figure 3.5*. Histogram of degree being studied**

Figure 3.6 shows the sample profile in terms of current year of study year. The largest number of participants were in their second (40%) and third (35%) year of study.

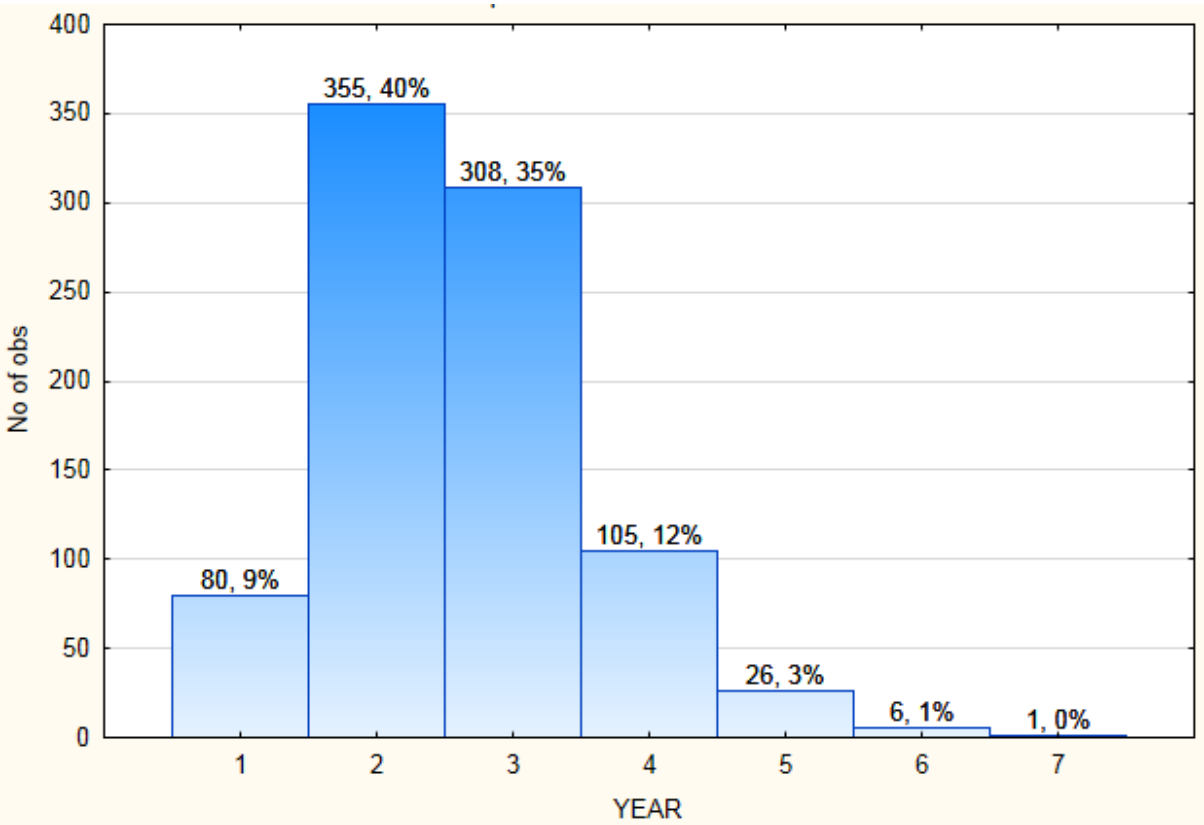


***Figure 3.6*. Year of study**

3.6 MEASUREMENT INSTRUMENT

Evaluating the fit of the three JCMs firstly requires a measure that will capture the participants' levels on each latent variable in the models. The instrument that was utilised was the JDS, with slight adaptations (Hackman & Oldham, 1980).

The original JDS will be introduced first. Additional amendments will then be discussed and justified. To serve the epistemic ideal, it also is crucial that the strengths and shortcomings of this instrument (job characteristics, psychological states and outcomes) be taken into account so that the results can be interpreted with caution where necessary[26].

3.6.1 THE JOB DIAGNOSTIC SURVEY

The measuring instrument was compiled using the JDS (Hackman & Oldham, 1980), JDS-R (Idaszak & Drasgow, 1987), and JDS-R (Boonzaier, 2001). This was used as the primary data gathering method for this study. The psychological states in the original JDS (Hackman & Oldham, 1980) with minor adaptations (changes to the

[26] It is essential that it is known where the strengths and shortcomings of the instrument lie, so that the inferences made from the results are justified properly.

reverse-scored and negatively worded items), the job characteristics of the JDS-R (Idaszak & Drasgow, 1987), and the outcomes of the JDS-R (Boonzaier, 2001) were pooled to form an instrument to be used for this study. Items were also adjusted to fit the 'job' of a student.

3.6.1.1 REVISING THE JDS

Hackman and Oldham (1980) state that the main intended use of the JDS instrument is to diagnose existing jobs prior to work redesign and also to evaluate the effects of work redesign afterwards. For the purposes of this study, the instrument will be used solely for data gathering in order to test the model, and not for diagnostic purposes.

The JDS was constructed to measure each major class of variables in the JCM, including the job characteristics, critical psychological states and outcomes (Hackman & Oldham, 1980). The JDS is measured on a seven-point Likert scale (1 = low and 7 = high) and, after all the items have been scored, a motivating potential score for the job can be calculated using a multiplicative formula.

In later amendments to the JDS, Idaszak and Drasgow (1987) recognised the reverse-scored job characteristic items to be a major source of inconsistencies, and consequently created a revised version (JDS-R) of the instrument. The JDS-R has proven to be more psychometrically sound than the JDS (with regard to the job characteristic items). Boonzaier (2001) also made later amendments to the job characteristic items. The job characteristic items within this revised version will therefore be utilised.

Boonzaier and Boonzaier (1994) administered the JDS to approximately 6 000 employees in 130 job categories, ranging from semi-skilled to highly skilled managerial and professional employees, and found that the reverse-scored items on the JDS caused uncertainty in the interpretation of questions by the respondents. Boonzaier (2001) consequently suggests using the JDS-R and also made further amendments to the reverse-scored outcome items. The corrected outcome items proposed by Boonzaier (2001) will be used for this study. The final edited combination of the JDS can be seen in Figure 3.7. The fully corrected JDS can be seen in Appendix A. This includes reworded psychological state items.

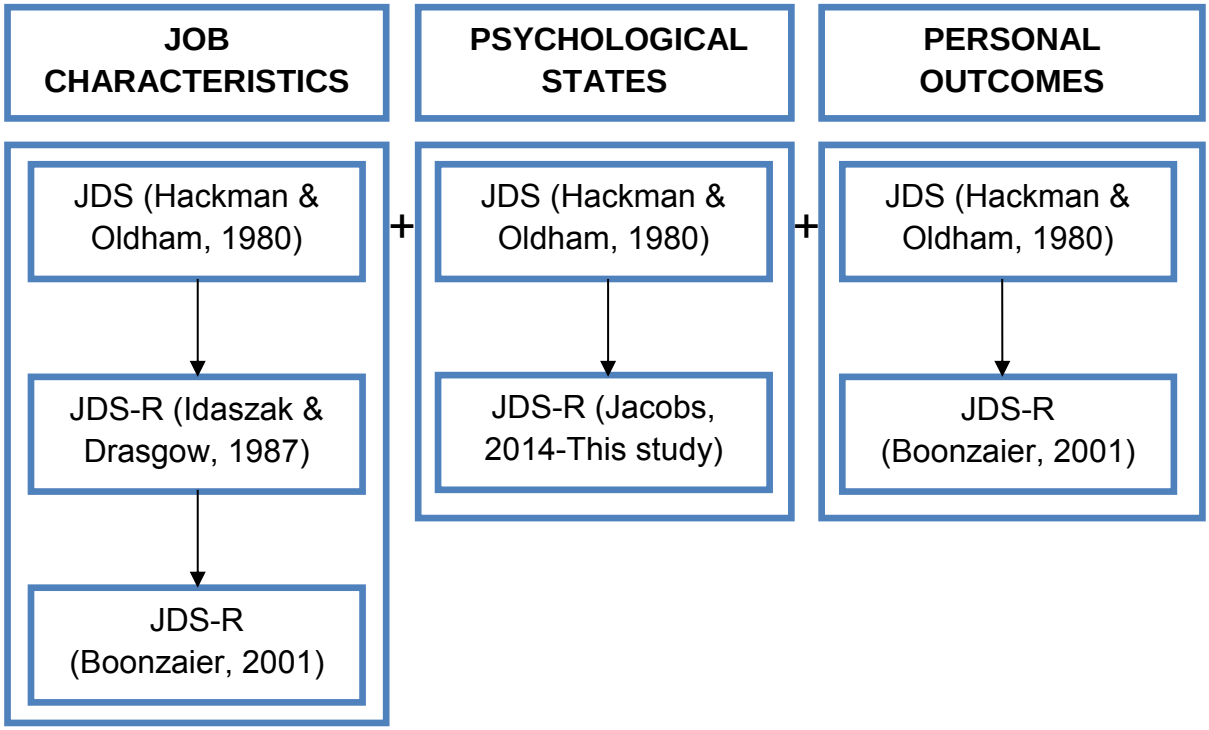


***Figure 3.7*. The new JDS influences**

3.6.1.2 ITEM STRUCTURE AND SCORING

Section one of the JDS requires the participant to describe his/her job as objectively as he/she can. The scores range from very little (1) to very much (7). This section contains five items. Section two of the JDS requires the participant to list a number next to a variety of “I” or “me” statements in describing the job. The scale ranges from very inaccurate (1) to very accurate (7) and comprises of 10 items. Section three requires the participant to indicate how he/she personally feels about the job on a range of “I” or “me” statements. The scale ranges from disagree strongly (1) to agree strongly (7) and consists of a total of 15 items. Section four requires the participant to indicate how satisfied he/she is with each aspect of the job on a range of “I” and “me” statements. This section consists of four items, with an answer scale ranging from extremely dissatisfied (1) to extremely satisfied (7). Section five requires the participant to think of how others in his/her organisation who hold the same job as him/her (or similar) would stand on the latent variable. This section is third person focussed, with a total of 10 items and a scale ranging from disagree strongly (1) to agree strongly (7).

Scoring of the JDS occurs in a very simple yet precise manner. An average score for each variable in the JCM is computed by adding and averaging relevant items. The items for the job characteristics are computed by adding and averaging scores:

Skill variety Section one: question 3 Section two: statements 1 and 4	**Autonomy** Section one: question 1 Section two: statements 6 and 9
Task identity Section one: question 2 Section two: statements 2 and 7	**Feedback** Section one: question 5 Section two: statements 3 and 8
Task significance Section one: question 4 Section two: statements 5 and 10	

The critical psychological states are measured both directly (section three) and indirectly (section five) via projective-type items. The critical psychological states are also computed by adding and averaging certain items:

Experienced meaningfulness of work Section three: statements 4 and 7 Section five: statements 3 and 6
Experienced responsibility for outcomes Section three: statements 1, 8, 12 and 15 Section five: statements 4 and 7
Knowledge of results Section three: statements 5 and 11 Section five: statements 5 and 10

With regard to the outcomes, general satisfaction and internal motivation are measured both directly (section three) and indirectly (section five), while growth satisfaction is measured only directly (section 4). The scores are also computed by adding and averaging the relevant items.

Internal work motivation
Section three: statements 2, 6, 10 and 14
Section five: statements 1 and 9
General job satisfaction
Section three: statements 3, 9 and 13
Section five: statements 2 and 8
Growth satisfaction
Section four: statements 1, 2, 3 and 4

3.6.1.3 NORMS

Boonzaier and Boonzaier (1994) summarised four different norm score groups, which can be seen in Table 3.2. The majority are for South African use.

Table 3.2

Norm Table – JDS Scores

LATENT VARIABLE	1*	2*	3*	4*
Skill variety	4.3	4.7	3.7	4.4
Task identity	4.5	4.7	5.1	4.7
Task significance	5.4	5.5	4.9	5.3
Autonomy	4.6	4.9	4.1	4.7
Feedback from job	4.7	4.9	5.1	5
Feedback from agents	4.3	4.1	4.2	4
Experienced meaningfulness	5.2	5.2	4.8	6
Experienced responsibility	4.8	5.5	5.1	5.8
Knowledge of results	4.7	5	4.9	5
Internal motivation	5.2	5.6	5.2	5.7
General satisfaction	4.7	4.7	4.4	5.6
Growth satisfaction	5	4.8	4.5	5.5

(Boonzaier & Boonzaier, 1994)

Study 1* (Boonzaier, 1989): A sample of 4 012 represented the majority of a workforce at a community service organisation with 46 organisation units spread

throughout South Africa and Namibia. The sample represented 93 different occupations, ranging from semi-skilled to highly skilled managerial and professional workers.

Study 2* (Oldham, Hackman & Stepina, 1979): These American-based norms were based on the responses of 6 930 employees in 876 different jobs in 56 organisations.

Study 3* (Forshaw, 1985): Compiled from the responses of 135 non-supervisory clerical insurance staff at a Cape Town-based company. The data represents 33 different jobs with qualifications ranging from grade 10 to 12.

Study 4* (Graham, 1978): The data represented 269 employees from 27 Cape Town-based organisations. The job standard ranged from unskilled to highly skilled.

3.6.2 PSYCHOMETRIC EVALUATION

There are two essential studies that will aid in the quest to understand the psychometric strengths and shortcomings of the JDS. Firstly, in a meta-analytic review of the literature on the JCM, Behson et al. (2000) used data from Arnold and House (1980); Barnabe and Burns (1994), Becherer et al. (1982), Champoux (1991), Fox and Feldman (1988), Griffeth (1985), Hackman and Oldham (1980), Hogan and Martell (1987), Johns, Xie and Fang (1992), Kiggundu (1980), Renn and Vandenberg (1995), Tiegs et al. (1992) and Wall et al. (1978) to compute mean correlations for the JDS, which will be useful in evaluating the validity of the instrument. Anastasi and Urbina (1997) suggests that the coefficient should be statistically significant at the 0.05 or 0.01 levels. A 0.2 or higher validity coefficient will be seen as acceptable for evaluating the JDS.

Secondly, in a doctoral dissertation, Boonzaier (2001) tabulated a vast number of studies that indicated the psychometric properties of the instrument. Huysamen (1996) suggests that the reliability coefficient should be 0.85 or higher to make decisions about individuals, and 0.65 or higher to make decisions about groups[27].

[27] As the JDS is usually administered in a group setting, 0.65 will be used as a benchmark value for the evaluation of the instrument.

3.6.2.1 RELIABILITY

Looking at Boonzaiers's (2001) review of job characteristics in Table 3.3, it can be assumed that all of the items can be used with confidence, since the mean reliabilities are higher than .65. It is also clear that the revised version has much higher mean reliabilities, which corroborate the use of it.

Table 3.3

Reliability Coefficients – JC

RESEARCHERS	SV	TI	TS	AT	FJ
Bhagat & Chassie (1980)	0.68	0.78	0.72	0.66	0.73
Birnbaum, Farh & Wong (1986)	0.79	0.72	0.81	0.84	0.71
Brief & Aldag (1976)	0.47	0.47	0.6	0.55	0.3
Champoux (1992)	0.78	0.67	0.54	0.7	0.64
Cordery & Savastos (1993)	0.72	0.65	0.69	0.72	0.73
Cordery & Savastos (1993)*	0.8	0.77	0.75	0.79	0.78
Dunham (1976)	0.76	0.72	0.72	0.73	0.75
Dunham, Aldag & Brief (1977)	0.68	0.7	0.68	0.69	0.69
Evans, Kiggundu & House (1979)	0.53	0.52	0.5	0.53	0.38
Forshaw (1985)	0.64	0.6	0.58	0.6	0.48
Fried & Ferris (1987)	0.69	0.69	0.67	0.69	0.7
Hackman & Oldham (1975)	0.71	0.59	0.66	0.66	0.71
Hogan & Martell (1987)	0.68	0.66	0.64	0.61	0.81
Johns, Xie & Fang (1992)	0.64	0.77	0.61	0.67	0.74
Kiggundu (1980)	0.78	0.62	0.59	0.63	0.7
Kim & Schuler (1979)	0.8	0.69	0.73	0.67	0.73
Munz, Huelsman, Konold & McKinney (1996)	0.77	0.74	0.72	0.77	0.81
Oldham, Hackman & Stepina (1979)	0.68	0.61	0.58	0.64	0.68
Renn & Vandenberg (1995)*	0.76	0.76	0.77	0.79	0.74
Spector & Jex (1991)*	0.7	0.81	0.74	0.87	0.83
Xie & Johns (1995)	0.76	0.67	0.64	0.74	0.73
Yeh (1996)	0.68	0.64	0.63	0.66	0.74
MEAN JDS	**0.69**	**0.65**	**0.64**	**0.67**	**0.67**
MEAN JDS-R	**0.75**	**0.78**	**0.75**	**0.81**	**0.78**

*Used JDS-R (Boonzaier, 2001)

Looking at Table 3.4 it is safe to assume that the outcomes can be utilised with confidence, since mean reliabilities in general fall well above the .65 standard.

Table 3.4

Reliability Coefficients – Outcomes

RESEARCHERS	INTERNAL MOTIVATION	GENERAL JOB SATISFACTION	GROWTH SATISFACTION
Champoux (1992)	0.6	0.78	0.77
Forshaw (1985)	0.68	0.74	0.7
Fried & Ferris (1987)	0.73	0.82	0.86
Hackman & Oldham (1975)	0.76	0.76	0.84
Hogan & Martell (1987)	0.61	0.82	0.24
Johns, Xie & Fang (1992)	0.6	0.75	0.84
Renn & Vandenberg (1995)	0.9	0.85	0.81
MEAN	**0.697**	**0.788**	**0.722**

(Boonzaier, 2001)

Reliabilities above .70 were found for all of the psychological states, which indicates that these items can be used with confidence (Table 3.5).

Table 3.5

Reliabilities – CPS

PSYCHOLOGICAL STATES	
Experienced meaningfulness	0.75
Experienced responsibility	0.71
Knowledge of results	0.72

(Behson et al., 2000)

3.6.2.2 VALIDITY

Factorial validities were drawn in the meta-analysis of Behson et al. (2000). Every correlate satisfied the basic standard of 0.2 (indicative of convergent validity), except for two correlates that did not. Skill variety correlated poorly with knowledge of results, and internal motivation correlated poorly with autonomy. These low correlations could be attributed to discriminant validity, however, as these constructs are conceptually different. These figures can be seen in Table 3.6.

Table 3.6

Correlation Matrix

VAR	SD	1	2	3	4	5	6	7	8	9	10	11
1. SV	1.57	1										
2. TS	1.25	0.41	1									
3. TI	1.44	0.22	0.2	1								
4. AT	1.39	0.43	0.32	0.32	1							
5. FJ	1.34	0.35	0.4	0.26	0.39	1						
6. EM	1.14	0.46	0.45	0.24	0.42	0.38	1					
7. ER	0.96	0.34	0.33	0.27	0.39	0.34	0.59	1				
8. KR	1.14	**0.16**	0.23	0.28	0.29	0.49	0.4	0.34	1			
9. SA	1.07	0.35	0.29	0.22	0.42	0.36	0.65	0.49	0.42	1		
10. GS	1.15	0.5	0.38	0.26	0.54	0.44	0.65	0.51	0.4	0.69	1	
11. IM	0.77	0.35	0.33	**0.17**	0.3	0.42	0.57	0.59	0.25	0.43	0.5	1

Behson et al., (2000)

3.7 MISSING VALUES

Prior to data analysis, an investigation of the presence of missing values was done. The method that was used depended on the number of missing values and the nature of the data, especially if the data followed multivariate normality.

A variety of methods can be used to fix the issue if missing values exist: (1) list-wise deletion, (2) pair-wise deletion, (3) imputation by matching, (4) multiple imputations, and (5) full information maximum likelihood[28].

[28] The chosen method will become clear in Chapter 4.

3.8 STATISTICAL ANALYSIS AND COMPUTER PACKAGES

Item analysis and structural equation modelling (SEM) were utilised to analyse the data captured by the JDS and to test the three proposed structural models.

3.8.1 ITEM ANALYSIS

The scales that were used to operationalise the variables in the structural model were developed to measure the dimensions of that construct that hold a unique qualitative definition. Therefore, the items were developed to gauge a participant's standing on that specific construct (according to the definition). The items were developed in such a way that they elicited a behavioural response from the participant that can be viewed as a nearly uncontaminated expression of that person's standing on the relevant latent variable. The measure captures these responses, which allows the opportunity to analyse the responses through a process named item analysis.

Item analysis is used to determine the internal consistency of the items on a given measure. This is done in order to find out whether each item of an instrument successfully reflects the variable it ought to reflect. Good items will discriminate successfully between the levels of the latent variables, while poor items will fail to do so. The objective therefore is to identify these poor items and make a decision on whether to alter the scale completely, or merely to remove the item. Item analysis was performed on the eleven subscales of the JDS. The statistical computer package used for this analysis was SPSS-19 (IBM, 2012).

3.8.2 STRUCTURAL EQUATION MODELLING

3.8.2.1 VARIABLE TYPE

The moment matrix utilised to examine the appropriate estimation technique to estimate the freed model parameters depends on the level on which the indicator variables were measured. The assumption is made that the indicator variables are continuance variables, measured on an interval level (Jöreskog & Sörbom, 1996a, 1996b; Mels, 2003). Consequently, the covariance matrix is estimated with maximum likelihood estimation, provided that the multivariate normality assumption is satisfied (Du Toit & Du Toit, 2001; Mels, 2003).

3.8.2.2 MULTIVARIATE NORMALITY

Before proceeding with the main analysis, it was first necessary to evaluate the extent to which the data satisfies the underlying assumptions of multivariate statistics and SEM (Tabachnick & Fidell, 2007). If the data fails to satisfy this assumption, it would seriously impede the trustworthiness of the inferences made from the results. If the null hypothesis of multivariate normality is rejected, normalisation will be attempted. The success of this normalisation will be confirmed by testing this null hypothesis once more. It was decided that, if the null hypothesis remained rejected, robust maximum likelihood would be used as the estimation technique (Mels, 2003).

3.8.2.3 CONFIRMATORY FACTOR ANALYSIS

3.8.2.3.1 MEASUREMENT MODEL FIT

The measurement model represents the relationship between the latent variables and the respective indicator variables that comprise them. The purpose of confirmatory factor analysis is to determine whether the operationalisation of the latent variables in the model via item parcels was successful. The operationalisation is successful if the measurement model successfully reproduces the observed covariance matrix, and if the measurement model parameter estimates show that the majority of the variance in the indicator variables can be explained in terms of the latent variables they load onto.

The measurement hypothesis being evaluated prophesises that the measurement model provides a valid account for the process that produced the observed covariance matrix (Hair, Black, Babin, Anderson & Tatham, 2006). If the measurement model provides a perfect explanation of the underlying truth, then the following exact fit null hypothesis would be true:

$^{a}H_{01}$: RMSEA = 0	$^{b}H_{02}$: RMSEA = 0	$^{c}H_{03}$: RMSEA = 0
$^{a}H_{a1}$: RMSEA > 0	$^{b}H_{a2}$: RMSEA > 0	$^{c}H_{a3}$: RMSEA > 0

However, if the measurement model provides only an approximate description of the process that produced the covariance matrix, then the following close fit hypothesis would hold true:

[a]H_{04}: RMSEA ≤ 0.05	[b]H_{05}: RMSEA ≤ 0.05	[c]H_{06}: RMSEA ≤ 0.05
[a]H_{a4}: RMSEA > 0.05	[b]H_{a5}: RMSEA > 0.05	$_{c}H_{a6}$: RMSEA > 0.05

Measurement model fit was interpreted by inspecting the full spectrum of goodness of-fit-indices provided by LISREL (Diamantopoulos & Siguaw, 2000). Firstly, the exact and close fit hypotheses were tested using the goodness-of-fit statistics. RMSEA values typically indicate the goodness of fit. RMSEA < 0.05 indicates a very good fit, while RMSEA < 0.08 indicates reasonable fit. RMSEA > 0.08 will be considered unsatisfactory.

Fit residuals were also considered to evaluate the fit of the measurement model. Residuals refer to the differences between corresponding cells in the observed and fitted covariance/correlation matrices (Jöreskog & Sörbom, 1993). Standardised residuals can be considered large if they exceed +2.58 or -2.58 (Diamantopoulos & Siguaw, 2000). Residuals should be scattered symmetrically around zero. Residuals provide diagnostic information on sources of lack of fit in models (Jöreskog & Sörbom, 1993; Kelloway, 1998). Positive residuals indicate an underestimation, and consequently indicate the need for additional explanatory paths. Negative residuals indicate an overestimation, and consequently indicate the need to eliminate certain paths. The stem-and-leaf plots were also examined. When residuals are distributed approximately symmetrical around zero, it is indicative of good fit. The Q-plot also was interpreted. This plot was interpreted by the extent the data points fall on a 45-degree angle. If the points fall on the 45-degree angle, it is suggestive of good model fit (Jöreskog & Sörbom, 1993).

The measurement model modification indices were considered. Model modification indices show if any of the currently fixed parameters (i.e. paths), when freed in the model, would increase the fit of the model. Large modification index values (> 6.64) indicate that there is a possible path the researcher did not foresee that would improve the fit of the model significantly ($p < .01$) (Diamantopoulos & Siguaw, 2000; Jöreskog & Sörbom, 1993). When evaluating the modification indices of a measurement model, the goal will be to evaluate fit and not alter the model. Few possible new paths suggest that the model fits well.

Parameter estimates of the fitted measurement models were also considered. If a measure is designed to provide a valid reflection of a specific latent variable, then the slope of the regression of X on ξ in the fitted measurement model has to be substantial and significant (Diamantopoulos & Siguaw, 2000). The regression coefficients on the latent variables are significant ($p < .05$) if the t-values exceed 1.96. Significant indicator loadings provide validity evidence in favour of the indicators (Diamantopoulos & Siguaw, 2000). This was evaluated using the unstandardised lambda X and Y matrices. Hair et al. (2006) suggest that 0.71 is a sufficiently high value. Issues might arise when comparing the validity of different indicators measuring a particular construct.

Diamantopoulos and Siguaw (2000) recommend that the magnitudes of the standardised loadings should also be examined. This will be executed by examining the completely standardised solutions. These values can be interpreted as regression slopes. The square of the completely standardised factor loadings indicates the proportion of indicator variance explained in terms of the latent variable it is meant to express (Diamantopoulos & Siguaw, 2000). Since each indicator only loads onto a single latent variable, the squared multiple correlations values should also be taken into account. The squared multiple correlations (R^2) of the indicators show the proportion of variance in an indicator that is explained by its respective latent variable. A high R^2 value would indicate that variance in the indicator in question reflects variance in the latent variable to which it has been linked. The residual variance not explained by the latent variable can be attributed to systematic and random measurement error (Diamantopoulos & Siguaw, 2000). Values on the theta-delta and theta-epsilon matrices will be considered satisfactory if they are lower than .50 (Hair et al. 2006). Ultimately, if these statistics provide support for the quality fit of all three JCMs, then the structural models will be fitted.

3.8.2.3.2 STRUCTURAL MODEL FIT

When the measurement model fails to provide a perfect fit (H_{01} to H_{03} rejected) or successfully indicates a close fit (H_{04} to H_{06}), then the fit of the structural model can be determined by retesting H_{01} to H_{06}. The structural model will be fitted by analysing the covariance matrix. Maximum likelihood estimation will be used if the multivariate normality assumption is satisfied.

The structural model fit will be analysed by inspecting the variety of fit indices provided by the output (Diamantopoulos & Siguaw, 2000). RMSEA values typically indicate the goodness of fit. RMSEA < 0.05 indicates a very good fit, while RMSEA < 0.08 indicates reasonable fit. RMSEA > 0.08 will be considered unsatisfactory. The specific statistical hypotheses for each structural model were also tested (H_{07} to H_{059}). This was executed using beta and gamma matrices. The critical cut-off value for rejection must be outside the bounds of -1.96 and +1.96 to be considered significant ($p < 0.05$).

Fit residuals and parameter estimates were also interpreted in the same manner as for the measurement models. Additional consideration was given to the fact that values on the completely standardised beta and gamma matrices should not exceed unity, i.e. be lower than -1 or higher than +1 (Mels, 2000).

The modification indices and completely standardised expected change values (Diamantopoulos & Siguaw, 2000) calculated for the Γ and B matrices were also inspected to determine whether any meaningful possibilities were indicated to improve the fit of the model through the addition of additional paths. Modification of the model would only be considered if such alternations were theoretically sound (Diamantopoulos & Siguaw, 2000; Henning, Theron & Spangenberg, 2004).

Ultimately, the ideal circumstances would show that the model fits the data perfectly or reasonably well, the path coefficients are significant and of high magnitude, and a significant amount of variance is explainable.

The most important features of the research methodology have been spelled out and will be applied in the next section. The testing of the three models and the more detailed statistical hypotheses can now commence. The necessary preparations have been made and data is ready to be analysed.

CHAPTER 4

RESEARCH RESULTS

This section aims to present and critically examine the findings from the various analyses that were conducted. Results are presented in a chronological fashion, which displays the results in the order in which the analyses were conducted.

4.1 MISSING VALUES

The internet survey method utilised forced participants to fill out the questionnaire completely. The questionnaire could not be completed unless all of the answers were filled out. Using this method significantly decreased the number of missing values. However, there were ten anomalies in the data.

Due to the large sample it was decided that list-wise deletion would be used. This method is the most statistically safe, but only appropriate when a large sample is present. The ten cases with missing values were thus deleted, reducing the sample of 891 to 881.

4.2 ITEM ANALYSIS

Table 4.1 shows the summarised results from the item analyses conducted on the eleven subscales of the JDS-R. These findings can be examined using the previously determined standards of .65 (α) and .2 (R). The coefficient of internal consistency for all but one of the subscales was found to be satisfactory (> .65). The subscale inter-item correlations, which were all satisfactory (> .2), provided evidence of the fact that items comprising each subscale measured a similar construct.

Table 4.1

Psychometric Properties – JDS

Scale	Items	Mean	SD	Inter-item correlation	Alpha
SV	3	16.65	3.21	.48	.72
TI	3	15.80	3.14	.41	.67
TS	3	16.25	3.52	.43	.69
AT	3	14.70	3.53	.42	.68
FE	3	15.54	3.19	.41	.67
EM	4	20.75	3.68	.38	.69
ER	6	33.25	4.45	.23	.63
KR	4	21.56	3.73	.45	.76
IM	6	35.70	4.31	.33	.74
JS	5	24.52	4.75	.28	.65
GS	4	22.63	3.85	.53	.81

Specific analyses of each individual subscale were also done. These analyses indicated the differences in reliability that would occur if certain items were deleted. There were no instances in which the deletion of an item would have increased the reliability of an individual subscale. All the items were thus kept as they were[29]. The item analyses therefore were successful.

4.3 DATA SCREENING

The data was found to satisfy normality requirements. Robust maximum likelihood was utilised as the estimation technique. This technique essentially makes provision for any deviations from normality in the data.

4.4 MEASUREMENT MODEL

4.4.1 OVERALL FIT ASSESSMENT

The proposed measurement model was fitted and converged in 12 iterations. This model can be seen in Figure 4.1.

[29] The JDS has been subject to many item analyses since the 1980s.

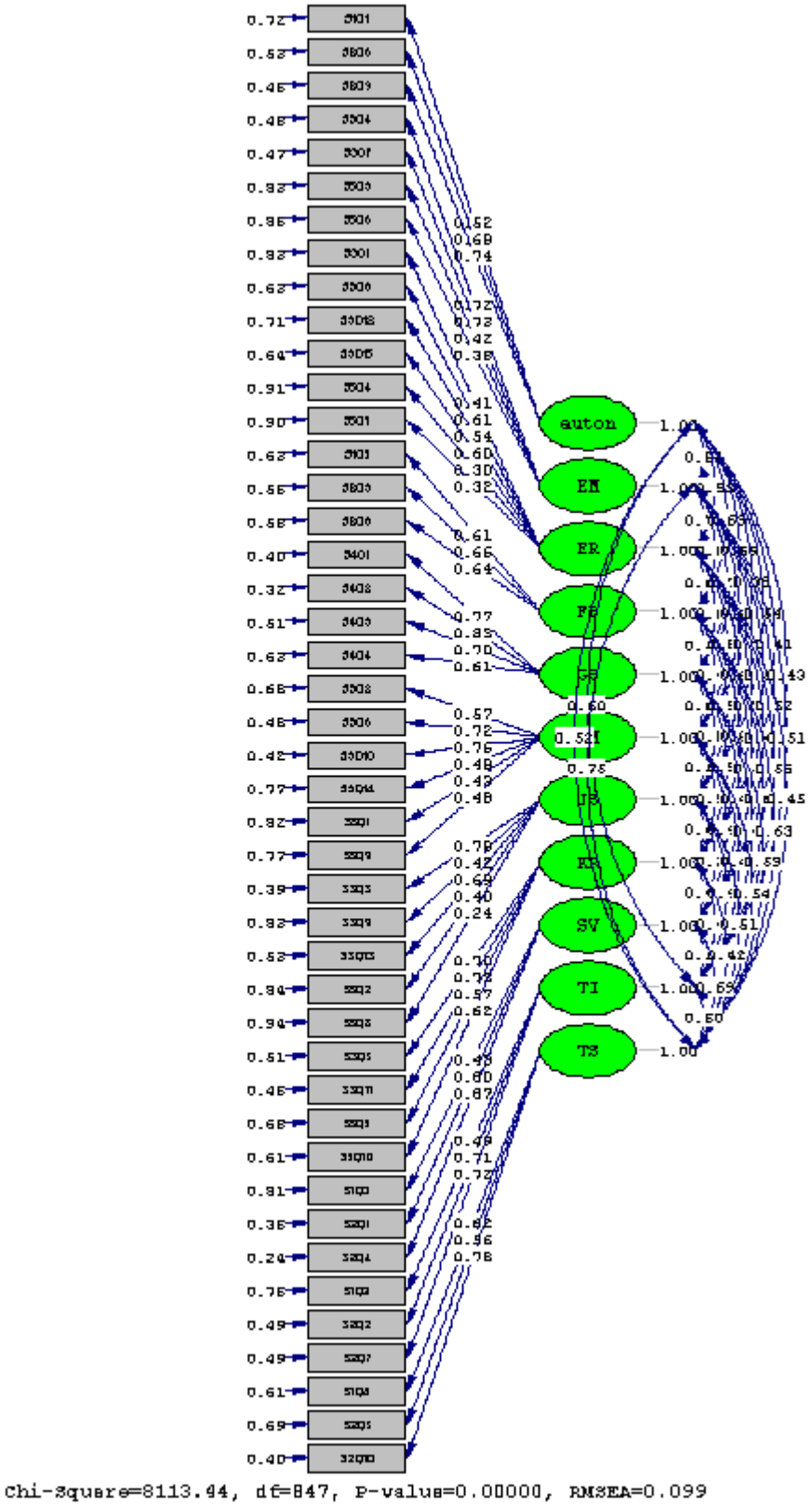


Figure 4.1. **Measurement model**

The goodness-of-fit statistics is depicted in Table 4.2. The model exhibited an inability to perfectly reproduce the observed covariance matrix. H_{01} was therefore rejected. The model also failed to show reasonable fit ($p > .05$), and consequently H_{04} also was rejected.

Table 4.2

Goodness-of-Fit Statistics – Measurement Model

Degrees of freedom = 847
Minimum fit function chi-square = 5 057.79 (P = 0.0)
Normal Theory weighted least squares chi-square = 8 019.31 (P = 0.0)
Satorra-Bentler scaled chi-square = 8 113.44 (P = 0.0)
Chi-square corrected for non-normality = 3 147.30 (P = 0.0)
Estimated non-centrality parameter (NCP) = 7 266.44
90 percent confidence interval for NCP = (6 981.39; 7 558.65)
Minimum fit function value = 5.75
Population discrepancy function value (F0) = 8.26
90 percent confidence interval for F0 = (7.93; 8.59)
Root mean square error of approximation (RMSEA) = 0.099
90 percent confidence interval for RMSEA = (0.097; 0.10)
P-value for test of close fit (RMSEA < 0.05) = 0.00

Due to the above failings, a second measurement model was tested in an attempt to improve the fit. The problem variable was identified to be experienced meaningfulness, which was removed for the second fit attempt. This model converged in 10 iterations. A visual representation can be seen in Figure 4.2.

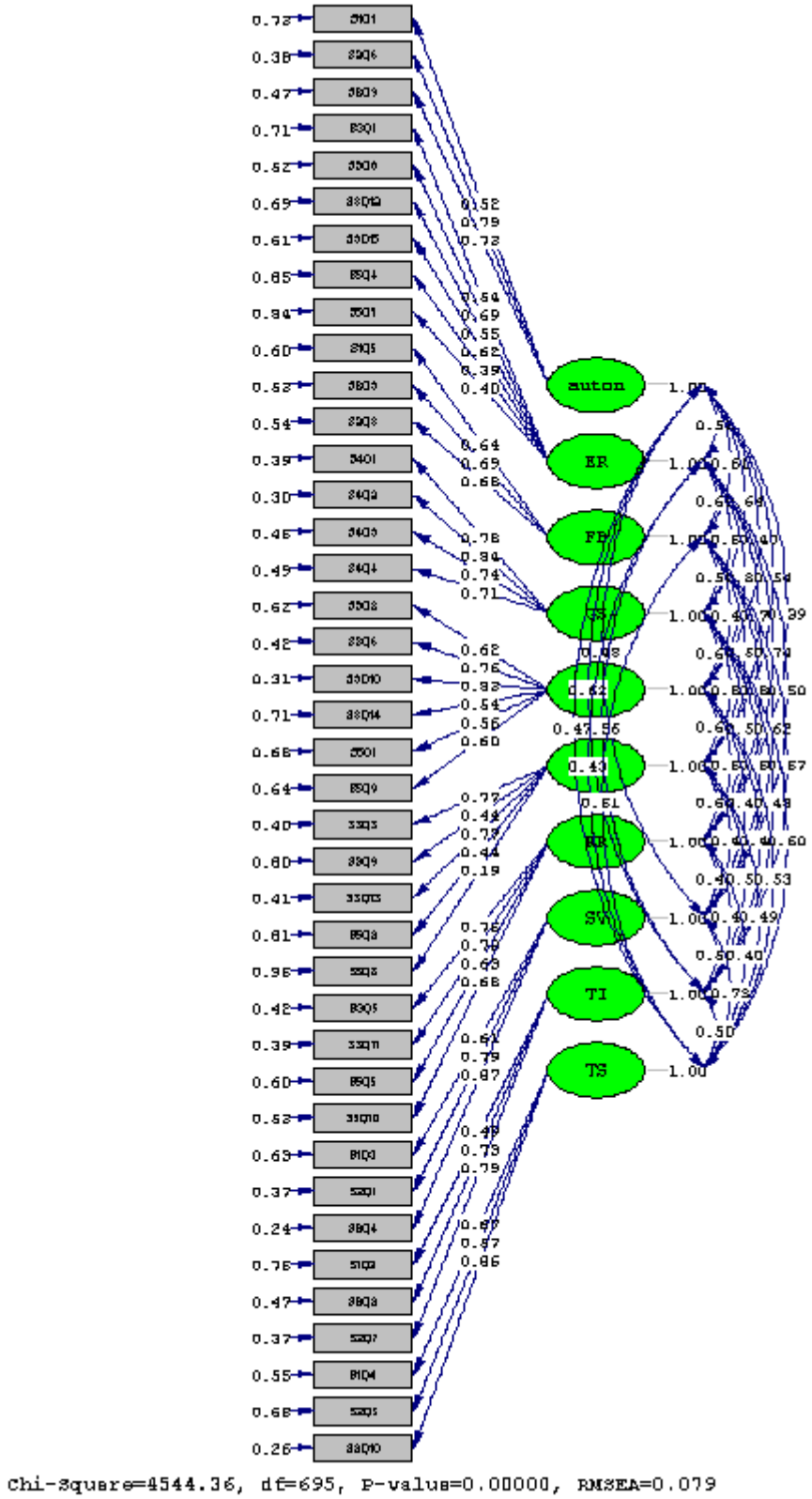


***Figure 4.2*. Measurement model – no experienced meaningfulness**

Table 4.3 shows the goodness-of-fit statistics for this model. This model also lacked the ability to perfectly reproduce the observed covariance matrix. H_{01} was consequently rejected ($p < .05$). The model furthermore appears to show reasonable fit, with a RMSEA of 0.079. H_{04} for good fit consequently was also rejected ($p < .05$).

Table 4.3

Goodness-of-Fit Statistics – Measurement Model (No EM)

Degrees of freedom = 695
Normal Theory weighted least squares chi-square = 7 502.59 (P = 0.0)
Satorra-Bentler scaled chi-square = 4 544.36 (P = 0.0)
Chi-square corrected for non-normality = 11 286.22 (P = 0.0)
Estimated non-centrality parameter (NCP) = 3 849.36
90 percent confidence interval for NCP = (3 639.84; 4 066.24)
Minimum fit function value = 4.00
Population discrepancy function value (F0) = 4.37
90 percent confidence interval for F0 = (4.14; 4.62)
Root mean square error of approximation (RMSEA) = 0.079
90 percent confidence interval for RMSEA = (0.077; 0.082)
P-value for test of close fit (RMSEA < 0.05) = 0.00

Although the model showed a slightly better fit that the original model, it was decided to keep experienced meaningfulness in the model. This decision was taken due to the importance of this variable and the fact that fit did not increase significantly when it was removed.

4.4.2 RESIDUAL ANALYSIS

Table 4.4 shows the summary statistics for the standardised residuals. There were 155 residuals that surpassed the -2.58 negative standard. A total of 139 positive large residuals were found surpassing 2.58. The total number of residuals can be calculated as 27*28, which is equal to 756. The total number of large residuals that were identified by LISREL (318) therefore is only 49% of the total. This statistic corroborates the poor fit of the model.

Table 4.4

Measurement Model – Residual Summary Statistics

Smallest standardised residual =	**-11.90**
Median standardised residual =	**0.00**
Largest standardised residual =	**96.86**

Table 4.5 indicates the stem-and-leaf plot for the standardised residuals. Although residuals appear to flock around zero, there still is a positive inclination. This indicates that the measurement model tends to underestimate rather than overestimate the observed covariance matrix.

Table 4.5

Measurement Model – Stem-and-Leaf Plot

```
- 1|20
- 0|999999888777777777766666666665555555555555555555555555555555444444444444+91
  0|111111111111111111111111111111111111111111111111111111111111111111111111+90
  1|000001111112233444577889 9
  2|0017
  3|3
  4|29
  5|
  6|
  7|
  8|
  9|7
```

Figure 4.3 shows the standardised residual Q-plot. Residuals appear to deviate from the 45-degree reference line. This is especially true for residuals outside the bounds of -1 and 1. This representation corroborates the poor fit of the model.

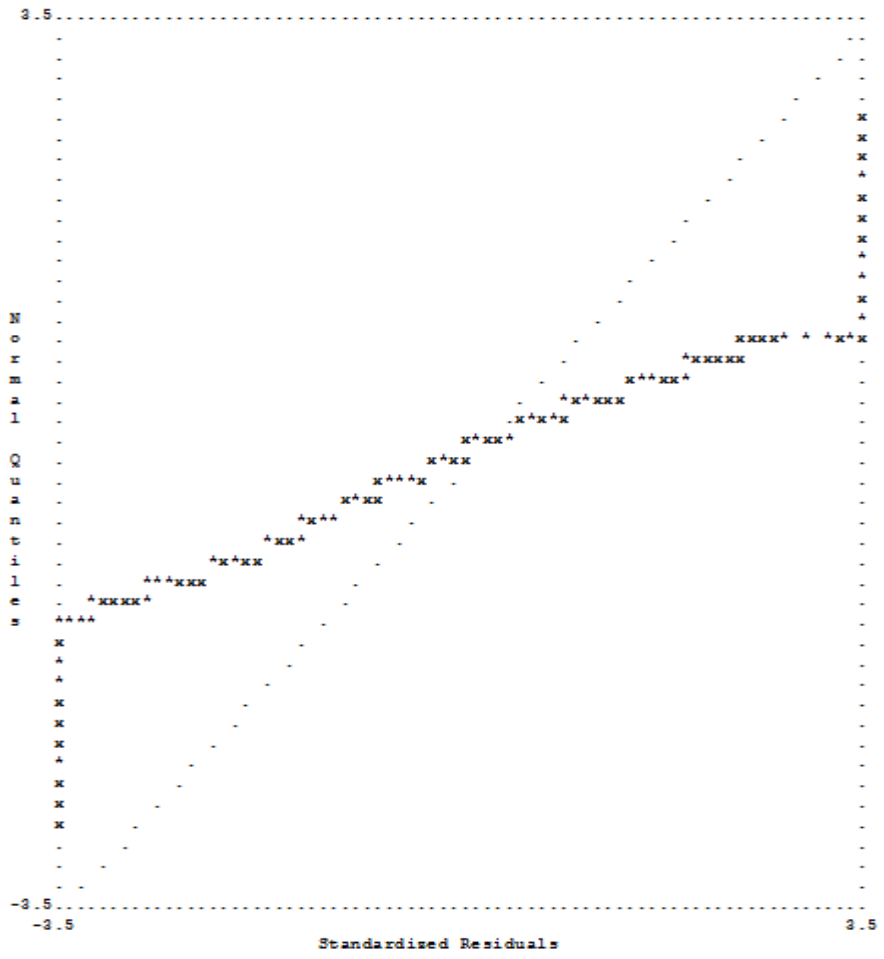


***Figure 4.3*. Measurement model - Q-plot**

4.4.3 DIRECT EFFECTS

The first half of the indicator loadings can be seen in Table 4.6, which represents the unstandardised lambda-x matrix. All of the indicators loaded significantly onto their respective latent variables ($p < .05$).

Table 4.6

Measurement Model – Unstandardised Λ_x Matrix

	AT	EM	ER	FB	GS	IM
S1Q1	0.52	- -	- -	- -	- -	- -
	(0.03)					
	17.60					
S2Q6	0.68	- -	- -	- -	- -	- -
	(0.03)					
	26.97					
S2Q9	0.74	- -	- -	- -	- -	- -
	(0.02)					
	31.43					
S3Q4	- -	0.72	- -	- -	- -	- -
		(0.02)				
		37.17				
S3Q7	- -	0.73	- -	- -	- -	- -
		(0.02)				
		36.69				
S5Q3	- -	0.42	- -	- -	- -	- -
		(0.03)				
		13.98				
S5Q6	- -	0.38	- -	- -	- -	- -
		(0.03)				
		12.46				
S3Q1	- -	- -	0.41	- -	- -	- -
			(0.03)			
			12.91			
S3Q8	- -	- -	0.61	- -	- -	- -
			(0.03)			
			23.59			
S3Q12	- -	- -	0.54	- -	- -	- -
			(0.03)			
			19.76			
S3Q15	- -	- -	0.60	- -	- -	- -
			(0.03)			
			23.98			
S5Q4	- -	- -	0.30	- -	- -	- -
			(0.03)			
			8.82			
S5Q7	- -	- -	0.32	- -	- -	- -
			(0.03)			
			9.55			
S1Q5	- -	- -	- -	0.61	- -	- -
				(0.03)		
				24.11		
S2Q3	- -	- -	- -	0.66	- -	- -
				(0.02)		
				28.56		

S2Q8	**- -**	**- -**	**- -**	**0.64**	**- -**	**- -**
				(0.02)		
				26.23		
S4Q1	**- -**	**- -**	**- -**	**- -**	**0.77**	**- -**
					(0.02)	
					45.73	
S4Q2	**- -**	**- -**	**- -**	**- -**	**0.83**	**- -**
					(0.01)	
					57.09	
S4Q3	**- -**	**- -**	**- -**	**- -**	**0.70**	**- -**
					(0.02)	
					34.55	
S4Q4	**- -**	**- -**	**- -**	**- -**	**0.61**	**- -**
					(0.02)	
					25.70	
S3Q2	**- -**	**- -**	**- -**	**- -**	**- -**	**0.57**
						(0.03)
						21.68
S3Q6	**- -**	**- -**	**- -**	**- -**	**- -**	**0.72**
						(0.02)
						35.62
S3Q10	**- -**	**- -**	**- -**	**- -**	**- -**	**0.76**
						(0.02)
						40.15
S3Q14	**- -**	**- -**	**- -**	**- -**	**- -**	**0.48**
						(0.03)
						16.54
S5Q1	**- -**	**- -**	**- -**	**- -**	**- -**	**0.43**
						(0.03)
						13.93
S5Q9	**- -**	**- -**	**- -**	**- -**	**- -**	**0.48**
						(0.03)
						16.30

The second half of the loadings can be seen in Table 4.7, which also represents the unstandardised lambda x matrix. Again, all of the indicators loaded significantly onto their respective latent variables ($p < .05$).

Table 4.7

Measurement Model – Unstandardised Λ_x Matrix

	JS	KR	SV	TI	TS
	---	---	---	---	---
S3Q3	0.78	- -	- -	- -	- -
	(0.02)				
	43.71				
S3Q9	0.42	- -	- -	- -	- -
	(0.03)				
	13.74				
S3Q13	0.69	- -	- -	- -	- -
	(0.02)				
	33.06				
S5Q2	0.40	- -	- -	- -	- -
	(0.03)				
	13.11				
S5Q8	0.24	- -	- -	- -	- -
	(0.03)				
	7.09				
S3Q5	- -	0.70	- -	- -	- -
		(0.02)			
		32.60			
S3Q11	- -	0.73	- -	- -	- -
		(0.02)			
		35.77			
S5Q5	- -	0.57	- -	- -	- -
		(0.03)			
		21.84			
S5Q10	- -	0.62	- -	- -	- -
		(0.02)			
		25.57			
S1Q3	- -	- -	0.43	- -	- -
			(0.03)		
			14.34		
S2Q1	- -	- -	0.80	- -	- -
			(0.02)		
			43.04		
S2Q4	- -	- -	0.87	- -	- -
			(0.02)		
			50.85		
S1Q2	- -	- -	- -	0.49	- -
				(0.03)	
				16.02	
S2Q2	- -	- -	- -	0.71	- -
				(0.02)	
				29.11	
S2Q7	- -	- -	- -	0.72	- -
				(0.02)	

				28.92	
S1Q4	- -	- -	- -	- -	0.62
					(0.03)
					24.76
S2Q5	- -	- -	- -	- -	0.56
					(0.03)
					20.32
S2Q10	- -	- -	- -	- -	0.78
					(0.02)
					36.77

4.4.4 COMPLETELY STANDARDISED SOLUTION

The first half of the loadings are depicted in Table 4.8 in the form of the completely standardised lambda x matrix. Loadings were generally below the .71 standard. However, this could be attributed to the loading method used (each item is an indicator). These statistics most probably would have been above .71 if item parcelling had been used. It is thus assumed that loadings are in fact sufficient.

Table 4.8

Measurement Model – Completely Standardised Λ_x Matrix

	AT	EM	ER	FB	GS	IM
	---	---	---	---	---	---
S1Q1	0.52	- -	- -	- -	- -	- -
S2Q6	0.68	- -	- -	- -	- -	- -
S2Q9	0.74	- -	- -	- -	- -	- -
S3Q4	- -	0.72	- -	- -	- -	- -
S3Q7	- -	0.73	- -	- -	- -	- -
S5Q3	- -	0.42	- -	- -	- -	- -
S5Q6	- -	0.38	- -	- -	- -	- -
S3Q1	- -	- -	0.41	- -	- -	- -
S3Q8	- -	- -	0.61	- -	- -	- -
S3Q12	- -	- -	0.54	- -	- -	- -
S3Q15	- -	- -	0.60	- -	- -	- -
S5Q4	- -	- -	0.30	- -	- -	- -
S5Q7	- -	- -	0.32	- -	- -	- -
S1Q5	- -	- -	- -	0.61	- -	- -
S2Q3	- -	- -	- -	0.66	- -	- -
S2Q8	- -	- -	- -	0.64	- -	- -
S4Q1	- -	- -	- -	- -	0.77	- -
S4Q2	- -	- -	- -	- -	0.83	- -
S4Q3	- -	- -	- -	- -	0.70	- -
S4Q4	- -	- -	- -	- -	0.61	- -
S3Q2	- -	- -	- -	- -	- -	0.57
S3Q6	- -	- -	- -	- -	- -	0.72
S3Q10	- -	- -	- -	- -	- -	0.76
S3Q14	- -	- -	- -	- -	- -	0.48
S5Q1	- -	- -	- -	- -	- -	0.43
S5Q9	- -	- -	- -	- -	- -	0.48

Table 4.9 represents the second half of the indicator loadings. Many of the indicators satisfied the .71 standard without the use of parcelling. It thus is assumed that those that did not would have performed adequately if parcelled. The statistics from both Table 4.8 and 4.9 therefore confirm the various items' success in representing their respective latent variables.

Table 4.9

Measurement Model – Completely Standardised Λ_x Matrix

	JS	KR	SV	TI	TS
S3Q3	0.78	- -	- -	- -	- -
S3Q9	0.42	- -	- -	- -	- -
S3Q13	0.69	- -	- -	- -	- -
S5Q2	0.40	- -	- -	- -	- -
S5Q8	0.24	- -	- -	- -	- -
S3Q5	- -	0.70	- -	- -	- -
S3Q11	- -	0.73	- -	- -	- -
S5Q5	- -	0.57	- -	- -	- -
S5Q10	- -	0.62	- -	- -	- -
S1Q3	- -	- -	0.43	- -	- -
S2Q1	- -	- -	0.80	- -	- -
S2Q4	- -	- -	0.87	- -	- -
S1Q2	- -	- -	- -	0.49	- -
S2Q2	- -	- -	- -	0.71	- -
S2Q7	- -	- -	- -	0.72	- -
S1Q4	- -	- -	- -	- -	0.62
S2Q5	- -	- -	- -	- -	0.56
S2Q10	- -	- -	- -	- -	0.78

4.4.5 VARIANCE EXPLAINABLE

The R^2 values in Table 4.10 show the proportion of variance in an indicator that is explained by its underlying latent variable. A high R^2 value would indicate that variance in the indicator reflects variance in the latent variable it reflects. The results indicate that some indicators successfully accounted for variance (> .5). However, most of the variance explainable was unsatisfactory. This could again be ascribed to the decision not to use parcelling. It cannot be expected from one item to account for more than .5 variance. The results are thus interpreted as generally satisfactory.

Table 4.10

Measurement Model – Squared Multiple Correlations

S1Q1	S2Q6	S2Q9	S3Q4	S3Q7	S5Q3
0.28	0.47	0.55	0.52	0.53	0.17

S5Q6	S3Q1	S3Q8	S3Q12	S3Q15	S5Q4
0.15	0.17	0.37	0.29	0.36	0.09

S5Q7	S1Q5	S2Q3	S2Q8	S4Q1	S4Q2
0.10	0.37	0.44	0.42	0.60	0.68

S4Q3	S4Q4	S3Q2	S3Q6	S3Q10	S3Q14
0.49	0.37	0.32	0.52	0.58	0.23

S5Q1	S5Q9	S3Q3	S3Q9	S3Q13	S5Q2
0.18	0.23	0.61	0.17	0.47	0.16

S5Q8	S3Q5	S3Q11	S5Q5	S5Q10	S1Q3
0.06	0.49	0.54	0.32	0.39	0.19

S2Q1	S2Q4	S1Q2	S2Q2	S2Q7	S1Q4
0.65	0.76	0.24	0.51	0.51	0.39

S2Q5	S2Q10
0.31	0.60

Ultimately, the results provided mediocre support for the measurement model. However, it was decided that this was sufficient to continue the structural model fit.

4.5 JCM 1 STRUCTURAL MODEL

4.5.1 OVERALL FIT ASSESSMENT

The original JCM 1 solution was found permissible after 28 iterations. The completely standardised solution for the structural model of JCM 1 is depicted in Figure 4.4. The full spectrum of fit indices provided by LISREL can be seen in Table 4.11.

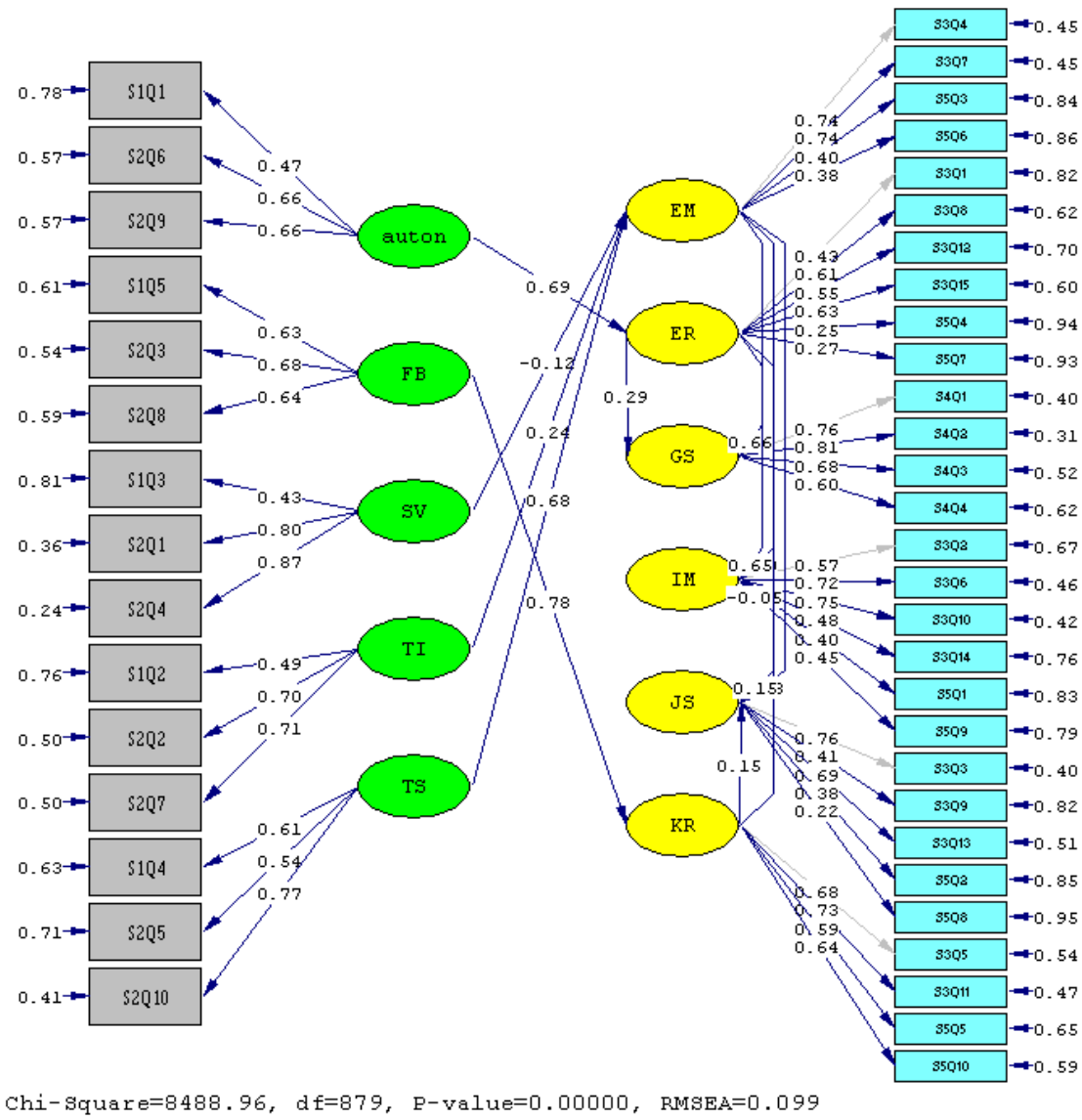


Figure 4.4. ***Fitted JCM 1 structural model***

Table 4.11

JCM 1 – Goodness-of-Fit Statistics

Degrees of freedom = 879
Minimum fit function chi-square = 5 500.14 (P = 0.0)
Normal Theory weighted least squares chi-square = 8 376.30 (P = 0.0)
Satorra-Bentler scaled chi-square = 8 488.96 (P = 0.0)
Chi-square corrected for non-normality = 3 893.45 (P = 0.0)
Estimated non-centrality parameter (NCP) = 7 609.96
90 percent confidence interval for NCP = (7 318.24; 7 908.84)
Minimum fit function value = 6.25
Population discrepancy function value (F0) = 8.65
90 percent confidence interval for F0 = (8.32; 8.99)
Root mean square error of approximation (RMSEA) = 0.099
90 percent confidence interval for RMSEA = (0.097; 0.10)
P-value for test of close fit (RMSEA < 0.05) = 0.00

The p-value of the Satorra-Bentler χ^2 in Table 4.11 indicates that the model is not able to perfectly reproduce the observed covariance matrix ($p < .05$). H_{01} is therefore rejected in favour of the alternative hypothesis. The RMSEA value of .099 indicates poor fit. This value did not reach the critical cut-off of .08 for reasonable fit. H_{04} was consequently also rejected.

4.5.2 RESIDUAL ANALYSIS

Table 4.12 indicates the summary statistics for standardised residuals. There were 113 residuals that surpassed the -2.58 negative standard. A total of 205 positive large residuals were found surpassing 2.58. The total number of residuals can be calculated as 27*28, which is equal to 6. The total number of large residuals identified by LISREL (318) therefore is only 53% of the total. This statistic corroborates the poor fit of the model.

Table 4.12

JCM 1 - Summary Statistics for Standardised Residuals

Smallest standardised residual =	**-15.44**
Median standardised residual =	**0.00**
Largest standardised residual =	**86.40**

Table 4.13 shows the stem-and-leaf plot for JCM 1. The residual distribution appears to be positively skewed, indicating that the model parameters tend to underestimate the observed covariance matrix. The residuals furthermore appear to flock around zero, but not symmetrically. This typically indicates poor fit.

Table 4.13

JCM 1 – Stem-and-Leaf Plot

```
- 1|54
- 0|98777776666666665555555555544444444444444444444444444333333333333333333+96
  0|111111111111111111111111111111111111111111111111111111111111111111111111+96
  1|00000000112222223344444556778999
  2|13466
  3|18
  4|
  5|
  6|
  7|
  8|36
```

Figure 4.5 shows the Q-plot distribution of the residuals. The residuals appear to deviate substantially from the 45-degree reference line. This is especially true for residuals greater than -1 or less than +1. This furthermore confirms the poor fit of JCM 1.

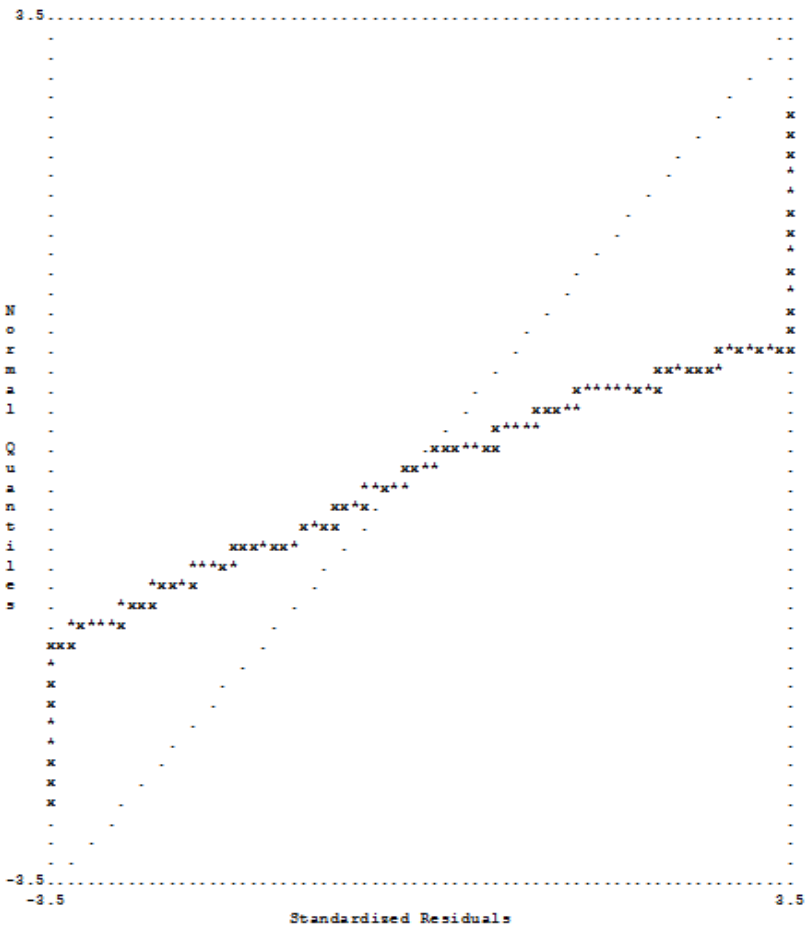


Figure 4.5. JCM 1 – Q-plot

4.5.3 DIRECT EFFECTS

Although the model showed poor fit, the proposed structural relations nevertheless were tested in the hope that some positive results could be salvaged. It consequently was necessary to test the statistical hypotheses proposed using the unstandardised Γ and B matrices. Table 4.14 shows the unstandardised gamma matrix. The proposed structural relation from skill variety to experienced meaningfulness was not significant ($p > .05$). H_{07} was therefore not rejected. H_{08} to H_{011} were rejected, as the paths proved to be significant as they fell beyond the bounds of -1.96 and 1.96 ($p < .05$). Furthermore, all of the relationships were positive, as proposed.

Table 4.14

JCM 1 - Unstandardised Γ Matrix

	AT	FB	SV	TI	TS
EM	- -	- -	-0.12	0.24	0.68
			(0.06)	(0.05)	(0.07)
			-1.83	4.83	10.32
ER	0.69	- -	- -	- -	- -
	(0.06)				
	10.92				
GS	- -	- -	- -	- -	- -
IM	- -	- -	- -	- -	- -
JS	- -	- -	- -	- -	- -
KR	- -	0.78	- -	- -	- -
		(0.04)			
		21.16			

Table 4.15 shows the unstandardised B matrix. The path from knowledge of results to internal motivation was found not to be significant ($p > .05$). H_{012} to H_{017} and H_{019} to H_{020} were rejected ($p < .05$). The positive relationships between these paths were also confirmed.

Table 4.15

JCM 1 – Unstandardised B Matrix

	EM	ER	GS	IM	JS	KR
EM	- -	- -	- -	- -	- -	- -
ER	- -	- -	- -	- -	- -	- -
GS	0.66	0.29	- -	- -	- -	- -
	(0.03)	(0.04)				
	19.35	7.32				
IM	0.30	0.65	- -	- -	- -	-0.05
	(0.04)	(0.06)				(0.04)
	7.75	10.45				-1.40
JS	0.78	0.15	- -	- -	- -	0.15
	(0.04)	(0.03)				(0.03)
	21.25	4.42				4.55
KR	- -	- -	- -	- -	- -	- -

4.5.4 COMPLETELY STANDARDISED SOLUTION

The completely standardised solution for gamma can be seen in Table 4.16. The significant effects appear to be sufficiently large. The most pronounced of these is the relationship between feedback and knowledge of results. This was closely followed by the relationships between task significance and experienced meaningfulness and between autonomy and experienced responsibility. None of the relationships exceeded unity, which supports the structural integrity of the relationships.

Table 4.16

JCM 1 – Completely Standardised Γ Matrix

	AT	FB	SV	TI	TS
EM	- -	- -	-0.12	0.24	0.68
ER	0.69	- -	- -	- -	- -
GS	- -	- -	- -	- -	- -
IM	- -	- -	- -	- -	- -
JS	- -	- -	- -	- -	- -
KR	- -	0.78	- -	- -	- -

The completely standardised beta matrix is depicted in Table 4.17. The significant structural relations appear to be satisfactory. The highest values are present in the path from experienced meaningfulness and growth satisfaction and from experienced meaningfulness and job satisfaction. The non-significant effect showed a negative relationship. Once again, not one of the values exceeded unity.

Table 4.17

JCM 1 – Completely Standardised B Matrix

	EM	ER	GS	IM	JS	KR
EM	- -	- -	- -	- -	- -	- -
ER	- -	- -	- -	- -	- -	- -
GS	0.66	0.29	- -	- -	- -	- -
IM	0.30	0.65	- -	- -	- -	-0.05
JS	0.78	0.15	- -	- -	- -	0.15
KR	- -	- -	- -	- -	- -	- -

4.5.5 VARIANCE EXPLAINABLE

Table 4.18 shows the R^2 values for the six endogenous latent variables. These values signify the amount of variance in each variable explained by the model. The model accounted for inadequate amounts of variance in only experienced responsibility. The model accounted for sufficient amounts of variance in all the other endogenous variables. Impressively high amounts of variance were accounted for in job satisfaction specifically.

Table 4.18

JCM 1 – Squared Multiple Correlations

EM	ER	GS	IM	JS	KR
0.56	0.47	0.67	0.63	0.85	0.61

4.5.6 POSSIBLE MODIFICATIONS

The model modification indices can be seen in Table 4.19. There were nine instances where the fit of the model could improve if additional paths were added (> 6.64). These findings provide evidence in favour of JCM 2 and 3.

Table 4.19

JCM 1 – Modification Indices for Γ

	auton	FB	SV	TI	TS
EM	10.62	5.76	- -	- -	- -
ER	- -	52.79	13.87	10.86	13.57
GS	7.33	5.64	3.64	0.09	2.09
IM	7.64	3.38	5.22	0.99	4.23
JS	3.23	5.71	26.88	3.04	28.04
KR	0.03	- -	3.30	3.50	0.56

Table 4.20 shows that there were 12 possible unforeseen paths that would significantly improve the fit of JCM 1. This again lends credence to the position that there is much more to JCM 1, and that JCM 2 and 3 might provide answers.

Table 4.20

JCM 1 – Modification Indices for B

	EM	ER	GS	IM	JS	KR
EM	- -	39.11	0.80	9.05	5.78	31.51
ER	43.17	- -	8.02	5.20	52.65	128.04
GS	- -	- -	- -	0.04	1.43	3.42
IM	- -	- -	0.11	- -	0.41	- -
JS	- -	- -	3.74	1.32	- -	- -
KR	14.24	51.28	19.60	51.76	21.49	- -

4.6 JCM 2 STRUCTURAL MODEL

4.6.1 OVERALL FIT ASSESSMENT

The solution was found permissible after 49 iterations. The fitted JCM 2 can be seen in Figure 4.6.

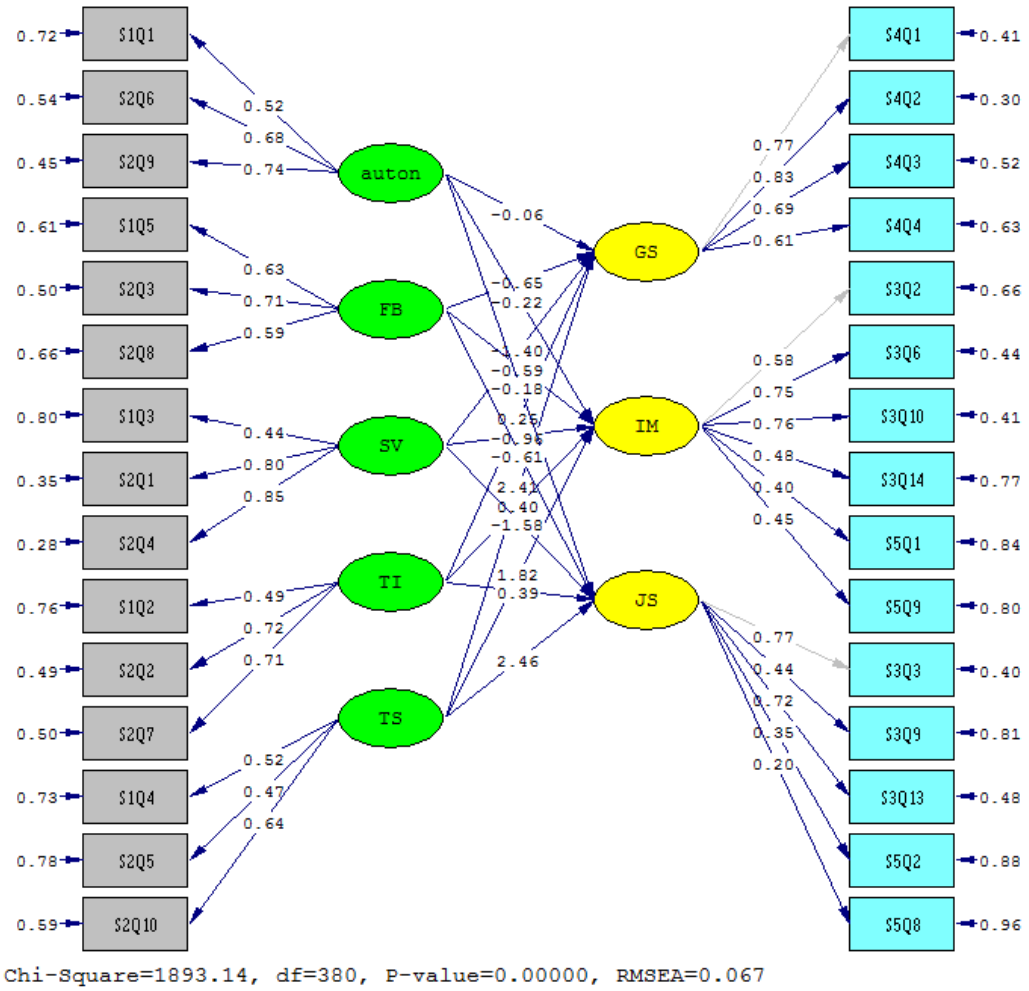


Figure 4.6. ***Fitted JCM 2 structural model***

The goodness-of-fit statistics can be seen in Table 21. The p-value of the Satorra-Bentler χ^2 in Table 4.21 indicates that the model is not able to perfectly reproduce the observed covariance matrix ($p < .05$). H_{02} therefore was rejected in favour of the alternative hypothesis. The RMSEA value of .067 indicates reasonable fit, but not acceptable fit. H_{05} consequently was also rejected in favour of the alternative hypothesis.

Table 4.21

JCM 2 – Goodness-of-Fit Statistics

Degrees of freedom = 380
Minimum fit function chi-square = 1 841.66 (P = 0.0)
Normal Theory weighted least squares chi-square = 1 871.95 (P = 0.0)
Satorra-Bentler scaled chi-square = 1 893.14 (P = 0.0)
Chi-square corrected for non-normality = 1 749.78 (P = 0.0)
Estimated non-centrality parameter (NCP) = 1 513.14
90 percent confidence interval for NCP = (1 381.07; 1 652.69)
Minimum fit function value = 2.09
Population discrepancy function value (F0) = 1.72
90 percent confidence interval for F0 = (1.57; 1.88)
Root mean square error of approximation (RMSEA) = 0.067
90 percent confidence interval for RMSEA = (0.064; 0.070)
P-value for test of close fit (RMSEA < 0.05) = 0.00

4.6.2 RESIDUAL ANALYSIS

Table 4.22 shows the summary statistics for the standardised residuals. There were 65 residuals that exceeded the -2.58 standard. Sixty-one positive large residuals were found. The total number of residuals can be calculated as 17*18, which is equal to 306. The total number of large residuals identified by LISREL (126) therefore is only 41% of the total. This statistics corroborate the reasonable fit of the model.

Table 4.22

JCM 2 – Summary Statistics for Standardised Residuals

Smallest standardised residual =	**-12.58**
Median standardised residual =	**0.00**
Largest standardised residual =	**269.33**

Table 4.23 shows the stem-and-leaf plot for the standardised residuals. Residuals appear to flock around zero, which indicates good fit. However, residuals show a very slight positive inclination.

Table 4.23

JCM 2 – Stem-and-Leaf Plot

```
- 0|3211987666655554444444444443333333333333333333333333333333333333333322222+96
  0|1111111111111111111111111111111111111111111111111222222222222222222222222222+72
  2|48
  4|
  6|
  8|
 10|
 12|
 14|
 16|
 18|
 20|
 22|
 24|
 26|9
```

Figure 4.7 shows the Q-plot for the standardised residuals. Residuals appear to deviate quite markedly from the 45-degree reference line. This is especially true for residuals from beyond the bounds of -1 and 1.

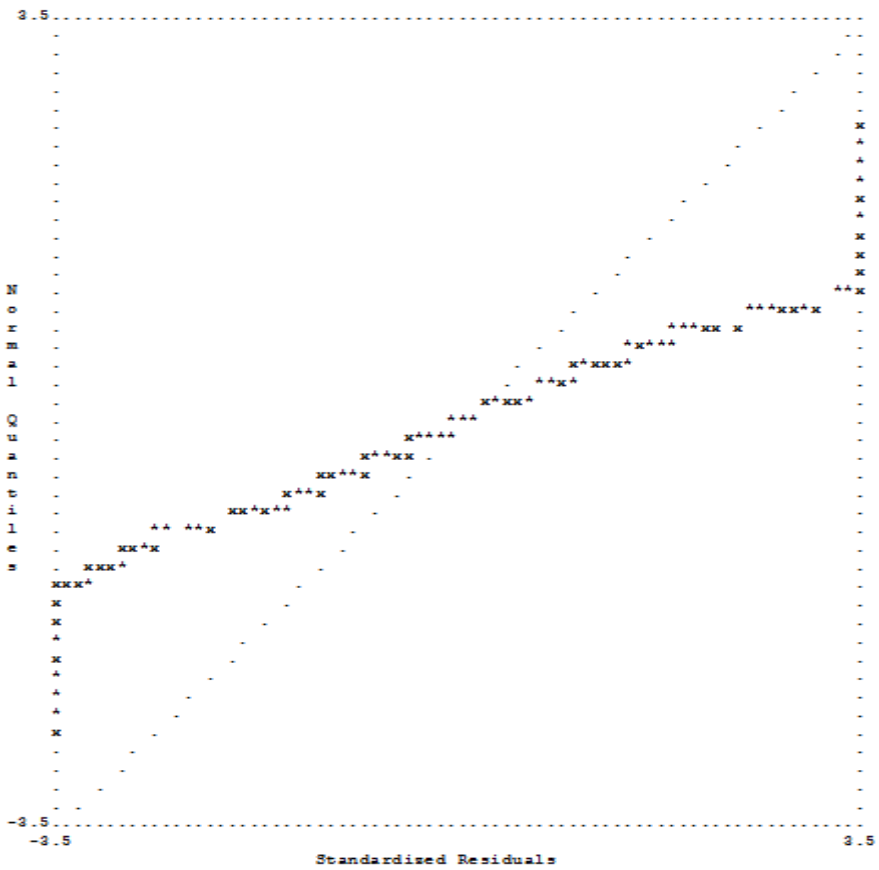


Figure 4.7. JCM 2 – Q-plot

4.6.3 DIRECT EFFECTS

The unstandardised gamma matrix is shown in Table 4.24. Paths from skill variety to the outcomes were found to be significant ($p < .05$) but negative, and consequently H_{021} to H_{023} were not rejected. Only one path from task identity was found to be significant ($p < .05$), and H_{024} was rejected. Paths from task significance proved significant, and consequently H_{027} to H_{029} were rejected. H_{030} to H_{032} were not rejected, since paths were found not to be significant ($p > .05$). On the other hand, feedback successfully loaded onto the outcomes, although a negative relationship was found. H_{033} to H_{035} therefore were not rejected.

Table 4.24

JCM 2 – Unstandardised Γ Matrix

	AT	FB	SV	TI	TS
GS	-0.06	-0.65	-1.40	0.25	2.41
	(0.20)	(0.29)	(0.34)	(0.21)	(0.47)
	-0.31	-2.29	-4.07	1.20	5.17
IM	-0.22	-0.59	-0.96	0.40	1.82
	(0.16)	(0.23)	(0.27)	(0.16)	(0.37)
	-1.40	-2.63	-3.56	2.46	4.98
JS	-0.18	-0.61	-1.58	0.39	2.46
	(0.21)	(0.30)	(0.36)	(0.22)	(0.48)
	-0.86	-2.05	-4.41	1.80	5.11

4.6.4 COMPLETELY STANDARDISED SOLUTION

The completely standardised solution for gamma can be seen in Table 4.25. This table indicates some real problems in the model. Although the propositions regarding autonomy failed, it is still cause for concern that all of the relationships were negative. However, the hypotheses proved unsuccessful at feedback. The problem is that the relationships are negative and strong (> .5). Skill variety showed similar issues, with additional problems arising because of the fact that two relationships exceeded unity. All three relationships between task significance and the outcomes exceeded unity by quite a bit, which is a concern. The only interpretable finding here is the significant relationship between task identity and internal motivation. However, this relationship is still quite weak (< .5).

Table 4.25

JCM 2 – Completely Standardised Γ Matrix

	AT	FB	SV	TI	TS
GS	-0.06	-0.65	-1.40	0.25	2.41
IM	-0.22	-0.59	-0.96	0.40	1.82
JS	-0.18	-0.61	-1.58	0.39	2.46

4.6.5 VARIANCE EXPLAINABLE

The squared multiple correlations for the outcomes can be seen in Table 4.26. Impressively high amounts of variance are accounted for in the outcomes, specifically in growth satisfaction and job satisfaction. The problem, however, is that although variance is explained, it is due to an unforeseen negative relationship.

Table 4.26

JCM 2 – Squared Multiple Correlations

GS	IM	JS
---	---	---
0.82	0.50	0.78

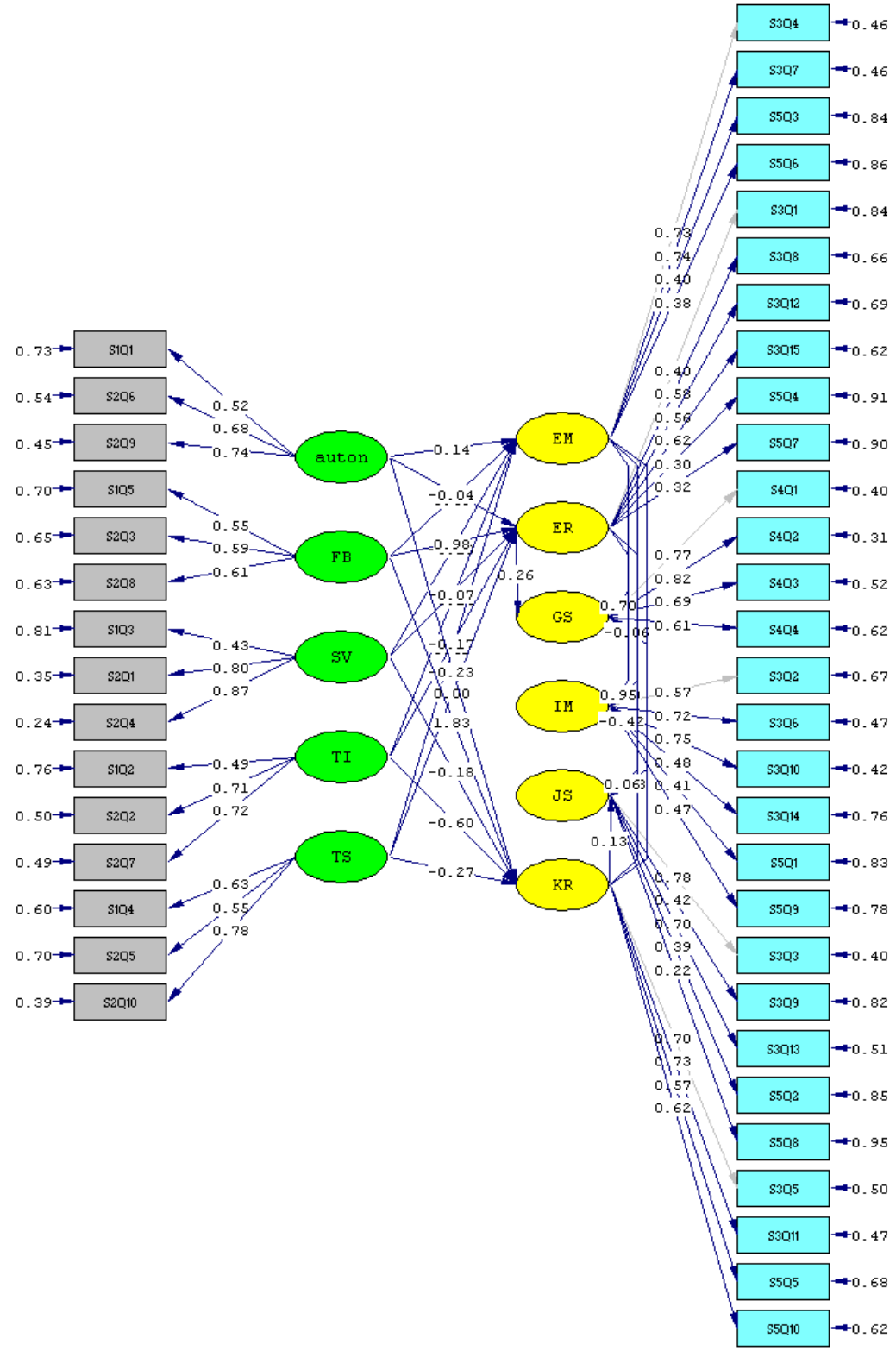
4.6.6 POSSIBLE MODIFICATIONS

As almost all of the possible paths in the model were predicted, LISREL estimated no possible model modifications that would significantly improve the fit of the model.

4.7 JCM 3 STRUCTURAL MODEL

4.7.1 OVERALL FIT ASSESSMENT

The solution was found permissible after 39 iterations. The fitted structural model can be seen in Figure 4.8.



Chi-Square=8273.85, df=868, P-value=0.00000, RMSEA=0.098

Figure 4.8 ***Fitted JCM 3 Structural Model***

Table 4.27 indicates the goodness-of-fit statistics for JCM 3. H_{03} was rejected, since the p-value associated with the Satorra-Bentler X2 was significant ($p < .05$). The model cannot reproduce the observed covariance matrix to perfection. The RMSEA of 0.098 indicates poor fit, and consequently H_{06} was also rejected ($p < .05$). The model fit can therefore be considered as unacceptable.

Table 4.27

JCM 3 – Goodness-of-Fit Statistics

Degrees of freedom = 868
Minimum fit function chi-square = 5 259.48 (P = 0.0)
Normal Theory weighted least squares chi-square = 8 164.71 (P = 0.0)
Satorra-Bentler scaled chi-square = 8 273.85 (P = 0.0)
Chi-square corrected for non-normality = 3 417.74 (P = 0.0)
Estimated non-centrality parameter (NCP) = 7 405.85
90 percent confidence interval for NCP = (7 117.99; 7 700.85)
Minimum fit function value = 5.98
Population discrepancy function value (F0) = 8.42
90 percent confidence interval for F0 = (8.09; 8.75)
Root mean square error of approximation (RMSEA) = 0.098
90 percent confidence interval for RMSEA = (0.097; 0.10)
P-value for test of close fit (RMSEA < 0.05) = 0.00

4.7.2 RESIDUAL ANALYSIS

Table 4.28 indicates the summary statistics for residuals. There were 143 residuals that exceeded the -2.58 standard. A total of 160 positive large residuals were found. The total number of residuals can be calculated as 24*25, which is equal to 600. The total number of large residuals identified by LISREL (303) therefore is only 51% of the total. This statistic essentially corroborates the poor fit of the model.

Table 4.28

JCM 3 – Summary Statistics for Standardised Residuals

Smallest standardised residual =	**-11.57**
Median standardised residual =	**0.00**
Largest standardised residual =	**75.57**

Table 4.29 shows the residual stem-and-leaf plot. Residuals appear to be distributed quite symmetrically around zero. However, residuals do appear to be positively skewed, indicating that the estimated parameter estimates tend to underestimate the observed covariance terms.

Table 4.29

JCM 3 – Stem-and-Leaf Plot

```
- 1|2
- 0|98888777776666666666666666666555555555555555555
- 0|4444444444444444444444444444444433333333333333333333333333333333333333+96
  0|111111111111111111111111111111111111111111111111111111111111111111111111+76
  0|5555555555555555556666666667777777777888888889999
  1|000000011222233444
  1|556778899
  2|113
  2|5
  3|3
  3|8
  4|2
  4|
  5|
  5|
  6|
  6|
  7|
  7|6
```

Figure 4.9 shows the Q-plot for the standardised residuals. There appears to be a clear deviation from the 45-degree reference line, corroborating the model's poor fit. This occurs especially at values beyond the bounds of -1 and 1.

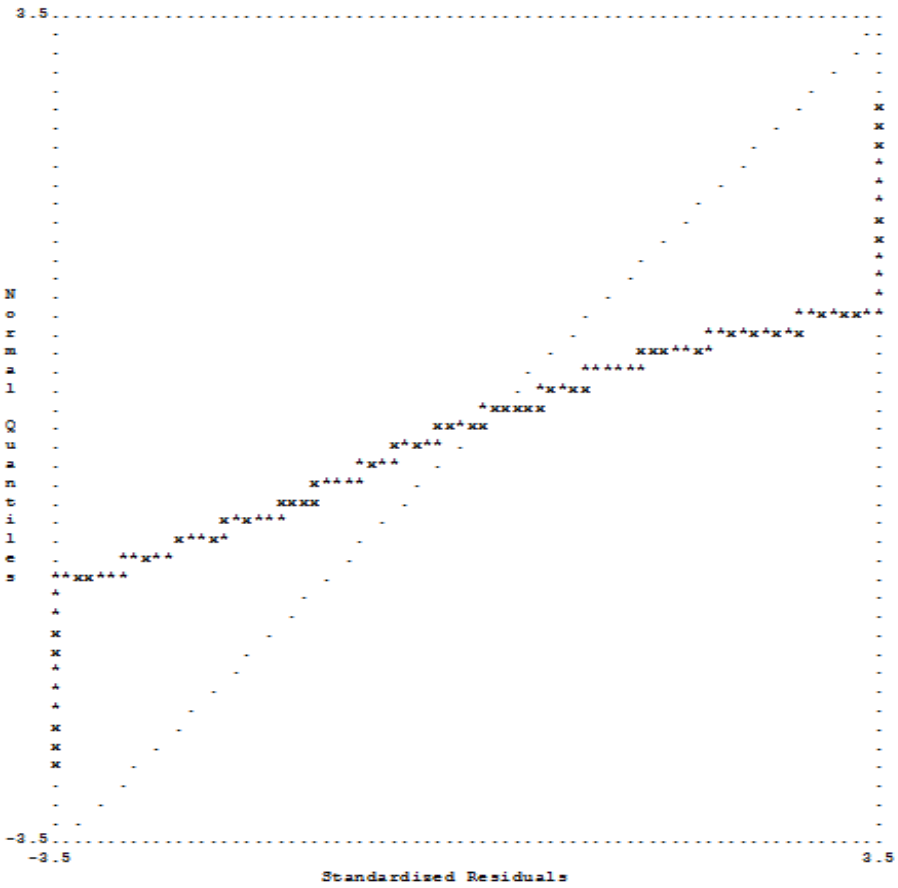


Figure 4.9 JCM 3 – Q-plot

4.7.3 DIRECT EFFECTS

Table 4.30 displays the gamma matrix for JCM 3. None of the loadings from skill variety onto the psychological states were found not to be significant ($p > .05$) and negative. H_{036} to H_{038} thus were not rejected. The proposed relationship between task identity and experienced meaningfulness and experienced responsibility proved not to be significant ($p > .05$), although negative. H_{039} to H_{041} therefore were not rejected. Relationships between task significance and experienced meaningfulness and knowledge of results were significant, but one was negative. Thus only H_{042} was rejected. The path between task significance and experienced responsibility proved not to be significant, thus H_{043} was not rejected. Another surprise was the fact that autonomy loaded onto experienced meaningfulness and knowledge of results successfully, whilst failing to load onto experienced responsibility. H_{045} consequently was rejected. The loadings from feedback to the psychological states proved highly successful, leaving H_{048} to H_{050} to be rejected.

Table 4.30

JCM 3 – Unstandardised Γ Matrix

	AT	FB	SV	TI	TS
EM	0.14	0.48	-0.10	-0.14	0.41
	(0.06)	(0.08)	(0.06)	(0.07)	(0.07)
	2.25	6.30	-1.50	-1.89	5.61
ER	-0.04	0.98	-0.07	-0.17	0.00
	(0.08)	(0.12)	(0.08)	(0.09)	(0.09)
	-0.48	8.30	-0.91	-1.87	0.04
GS	- -	- -	- -	- -	- -
IM	- -	- -	- -	- -	- -
JS	- -	- -	- -	- -	- -
KR	-0.23	1.83	-0.18	-0.60	-0.27
	(0.12)	(0.18)	(0.11)	(0.14)	(0.13)
	-2.02	10.09	-1.63	-4.15	-2.12

Table 4.31 shows the unstandardised beta matrix. Loadings from experienced responsibility to job satisfaction and from knowledge of results to growth satisfaction proved not to be significant ($p > .05$). Besides this, the psychological states loaded significantly onto the outcomes. A negative loading was also present between knowledge of results and internal motivation. H_{051} to H_{054} and H_{056} and H_{58} were consequently also rejected ($p < .05$).

Table 4.31

JCM 3 – Unstandardised B Matrix

	EM	ER	GS	IM	JS	KR
EM	- -	- -	- -	- -	- -	- -
ER	- -	- -	- -	- -	- -	- -
GS	0.70	0.26	- -	- -	- -	-0.06
	(0.04)	(0.06)				(0.07)
	16.24	3.99				-0.90
IM	0.30	0.95	- -	- -	- -	-0.42
	(0.05)	(0.12)				(0.09)
	6.14	7.77				-4.49
JS	0.83	0.06	- -	- -	- -	0.13
	(0.04)	(0.06)				(0.06)
	19.79	0.91				2.07
KR	- -	- -	- -	- -	- -	- -

4.7.4 COMPLETELY STANDARDISED SOLUTION

Table 4.32 indicates the completely standardised solution for gamma. The negative loadings that skill variety has on all of the psychological states is surprising. Albeit negative, the magnitudes of these loadings are insufficient. Task identity showed similar relationships to the psychological states. Loadings from task significance to experienced meaningfulness were found to be significant, but not strong enough. Feedback only showed a sufficient load onto experienced meaningfulness. Autonomy furthermore failed miserably in its loadings onto the psychological states.

Table 4.32

JCM 3 – Completely Standardised Γ Matrix

	auton	FB	SV	TI	TS
	---	---	---	---	---
EM	0.14	0.48	-0.10	-0.14	0.41
ER	-0.04	0.98	-0.07	-0.17	0.00
GS	- -	- -	- -	- -	- -
IM	- -	- -	- -	- -	- -
JS	- -	- -	- -	- -	- -
KR	-0.23	1.83	-0.18	-0.60	-0.27

Table 4.33 shows the completely standardised beta matrix. Experienced meaningfulness exhibited satisfactory factor loadings onto both growth satisfaction and job satisfaction. Experienced responsibility loaded very strongly onto internal motivation. The negative and insufficient loadings by knowledge of results onto the outcomes are also cause for concern.

Table 4.33

JCM 1 – Completely Standardised B Matrix

	EM	ER	GS	IM	JS	KR
	---	---	---	---	---	---
EM	- -	- -	- -	- -	- -	- -
ER	- -	- -	- -	- -	- -	- -
GS	0.70	0.26	- -	- -	- -	-0.06
IM	0.30	0.95	- -	- -	- -	-0.42
JS	0.83	0.06	- -	- -	- -	0.13
KR	- -	- -	- -	- -	- -	- -

4.7.5 VARIANCE EXPLAINABLE

Table 4.34 shows the variance explainable in the model. Sufficiently high amounts of variance were accounted for in all of the outcomes (> .5). The fact that the amount of variance explained in knowledge of results exceeds unity poses a problem, since the value exceeds unity.

Table 4.34

JCM 3 – Squared Multiple Correlations

EM	ER	GS	IM	JS	KR
0.58	0.63	0.69	0.72	0.88	1.12

4.7.6 POSSIBLE MODIFICATIONS

Table 4.35 shows the modification indices for gamma. Autonomy appears to leapfrog the psychological states and load directly onto the outcomes. This is true in the case of growth satisfaction and internal motivation (> 6.64). Skill variety and task significance appear to do the same with job satisfaction. By adding these paths, the fit of the model would increase significantly.

Table 4.35

JCM 3 – Modification Indices for Γ

	auton	FB	SV	TI	TS
EM	- -	- -	- -	- -	- -
ER	- -	- -	- -	- -	- -
GS	12.05	1.19	3.38	0.58	1.48
IM	10.17	0.22	1.73	2.06	1.80
JS	0.76	3.86	22.32	1.68	29.77
KR	- -	- -	- -	- -	- -

Table 4.36 shows the modification indices for beta. Adding paths between psychological states may also improve the fit of the model. A new path from experienced meaningfulness to experienced responsibility and vice versa would improve the fit of the model. Furthermore, loop paths from internal motivation to experienced meaningfulness, and from job satisfaction to experienced responsibility, are also believed to significantly improve the fit of the model.

Table 4.36

JCM 3 – Modification Indices for B

	EM	ER	GS	IM	JS	KR
	---	---	---	---	---	---
EM	- -	9.43	0.05	6.98	0.53	0.02
ER	12.37	- -	3.44	0.68	11.83	0.01
GS	- -	- -	- -	0.17	0.30	- -
IM	- -	- -	0.28	- -	0.05	- -
JS	- -	- -	2.17	0.21	- -	- -
KR	0.16	0.06	0.09	1.37	0.16	- -

4.8 PARTIAL LEAST SQUARES

Due to the ambiguity of some of the findings, PLS was utilised to corroborate LISREL's stance on the models. The results can be seen in Figures 4.10, 4.11 and 4.12. Black paths indicate a significant relationship, whilst red paths indicate a non-significant relationship. JCM 1 showed exactly the same results. In JCM 2, more relationships were found to be significant. However, most of the significant relationships were negative. In JCM 3, the results mirrored the LISREL findings. PLS accurately reproduced the findings of LISREL.

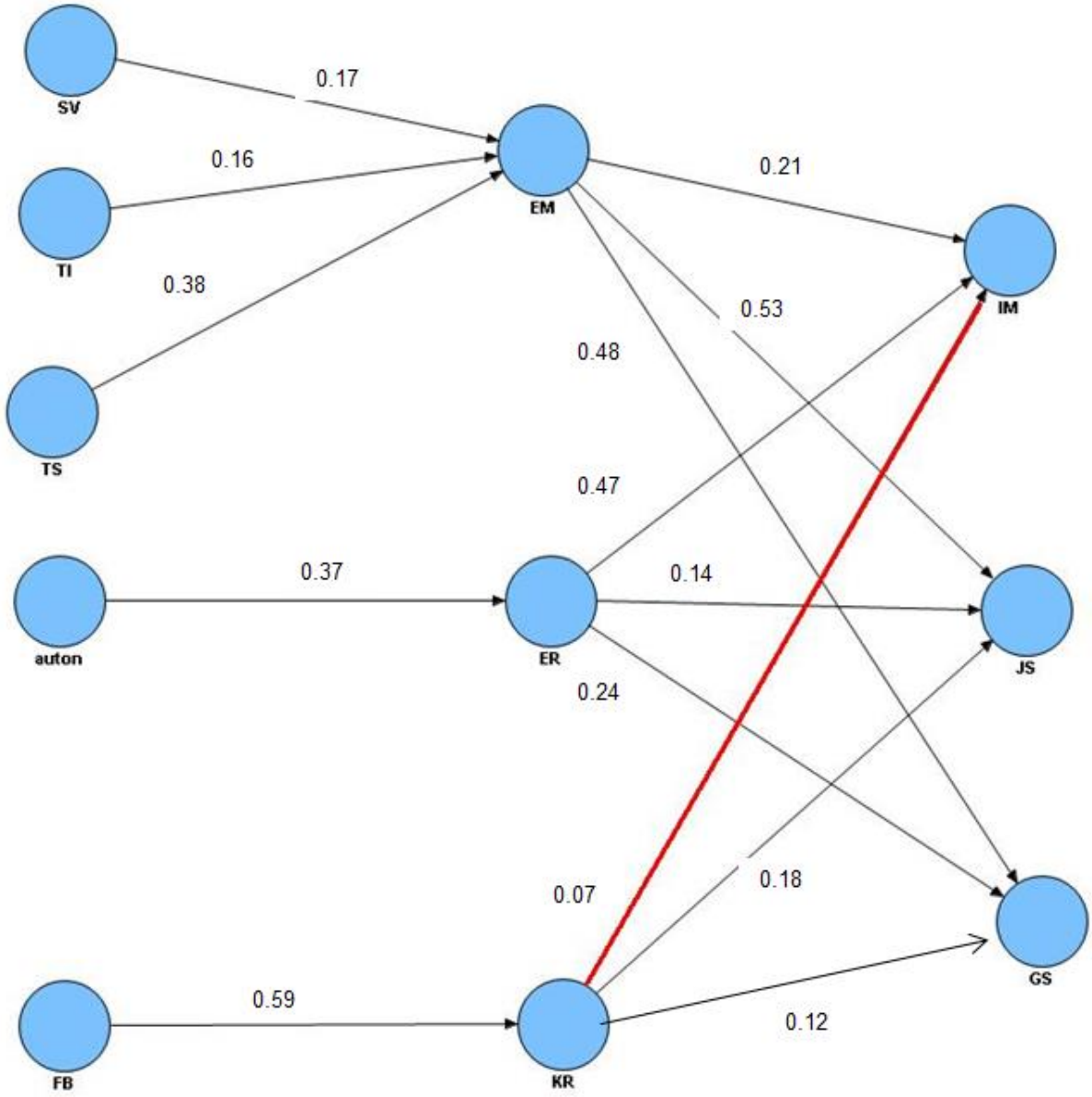


Figure 4.10. **JCM 1 – PLS model**

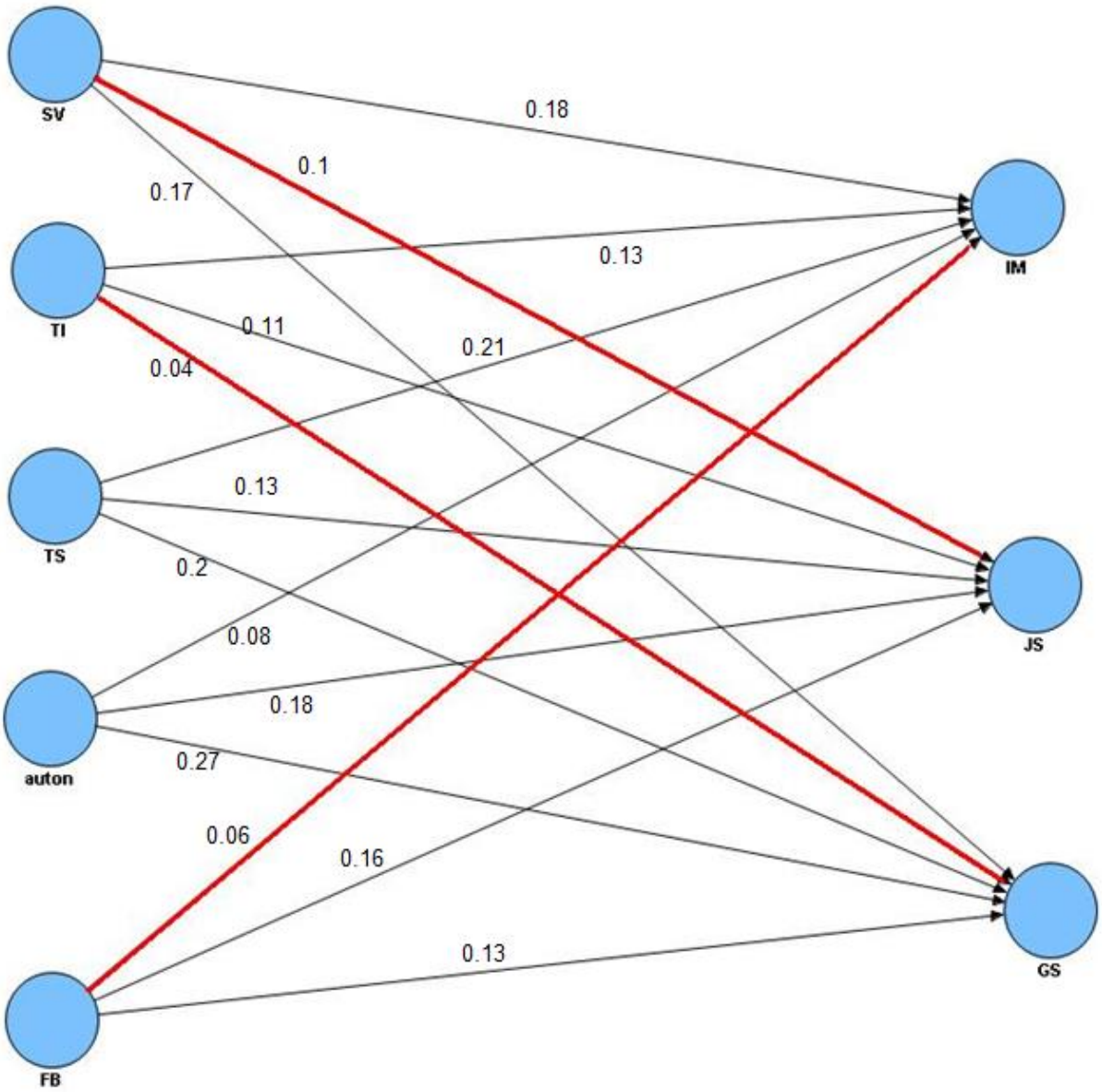


Figure 4.11. **JCM 2 – PLS model**

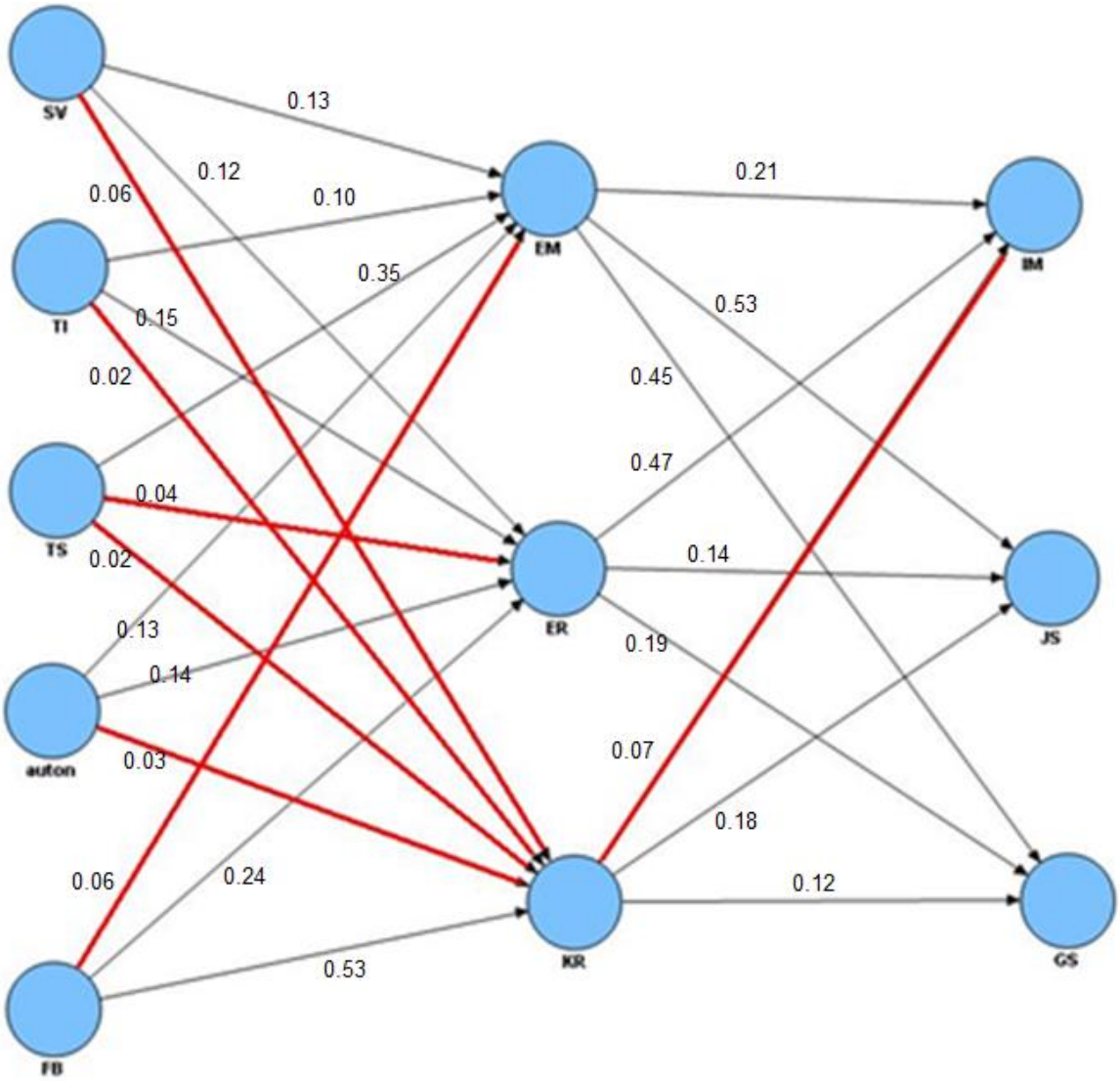


Figure 4.12 **JCM 3 – PLS model**

4.9 SAMPLE VARIABLE STANDINGS

Table 4.37 shows the various sample subgroup standings on the various latent variables measured by the JDS-R. Across degrees, the job characteristics were fairly similar, with BEng exhibiting slightly higher scores. The experienced psychological states and outcomes therefore also were approximately similar.

Table 4.37

Target Group Standings

	BComm	BA	BSc	BEng
SV	5.2	5.3	5.6	6.2
TI	5.2	5.3	5.1	5.4
TS	5.6	5.1	5.4	6.1
AT	4.8	5.1	4.8	4.8
FE	5.1	5.1	5	5.6
EM	5.2	5	5.1	5.5
ER	5.5	5.5	5.5	5.6
KR	5.3	5.3	5.3	5.7
IM	6	5.9	6	6
JS	4.9	4.9	4.9	4.9
GS	5.4	5.6	5.6	6

CHAPTER 5

CONCLUSION, RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This section aims to discuss and draw critical conclusions from the data. Many fertile research areas were identified in the analyses, hence suggestions will be given for future research. The limitations of the present study will also be discussed. A final comment will be made, revealing the main conclusion of this research.

5.1 INTRODUCTION

In Chapter 1, the argument was made that the human resource function should play an integral part in the creation and maintenance of a strategic completive advantage for companies. This is done through the attainment, management and development of people within organisations. There are a variety of methods that HR can utilise to ensure a productive workforce. One of these methods is to arrange the physical characteristics of jobs in such a manner that they will have a positive effect on the productivity of the workforce.

The most prominent tool in the field of work design is the JCM of Hackman and Oldham (1980). This theory has provided a vast number of pointers for practitioners who manage work design. The simplicity and clear benefits of this theory have been a reason for its success. However, when the theory was put under the microscope, gaps in it soon became apparent. Many researchers concluded that the theory has many problems, especially pertaining to the psychological states. These comments led to the use of variations of the theory and the JDS. The greatest problem was that the matter was never laid to rest. Practitioners and researchers alike still cannot reach consensus on whether the theory is valuable or not. It therefore was important to come to a final verdict on this model.

This realisation led to the empirical testing of the original model. Two additional models were created that resulted from the various criticisms levelled against the original work. These models were tested in a comparative fashion, using the latest statistical analysis techniques available today. This section will discuss the preliminary findings of the data simulation test and present the practical implications these might entail.

5.2 RESULTS

5.2.1 MEASUREMENT MODEL FIT

The JCM measurement model was tested through structural equation modelling. The full spectrum of fit indices were interpreted and it was found that the model fits the data poorly. A problem variable (job satisfaction) was identified and removed, which improved the fit to a reasonable degree. However, the improvement in fit was not substantial enough to omit the variable from the study completely. An analysis of the item loadings on the latent variables showed that all loadings were significant. As a result it was decided to utilise the poorly fitting model. The operationalisation of the latent variables was therefore found satisfactory and the study continued to fitting the structural models.

5.2.2 STRUCTURAL MODEL(S) FIT

Table 5.1 shows the comparative fit statistics. Fit-wise, JCM 2 is superior in all respects. Although LISREL took a longer time converging the model, the model still sported the lowest χ^2 with the best RMSEA. JCM 2 also had the best results in the residual analyses. Although the model did not reach close fit, it did have reasonable fit. It is commonly accepted that more complex models (such as JCM 1 and 2) with numerous variables have a greater chance of failing the test of close fit. With this said, it could be argued that JCM 3 is actually far superior to JCM 1, although the RMSEAs differ by only .01, since the model has ten additional paths in it. According to these fit results it can be argued that the structural design of the original JCM is flawed, as the two new models are superior.

Table 5.1

Comparative Fit Statistics

	JCM 1	JCM 2	JCM 3
Converged	Yes	Yes	Yes
Iterations	28	49	39
χ^2	8 488.96	1 893.14	8 273.85
RMSEA	0.099	0.067	0.098
Large residuals	53%	41%	51%
Residual distribution	Positive	Positive	Positive
Flock to zero	Yes	Yes	Yes
Overall fit	Poor	Reasonable	Poor

Table 5.2 shows the hypotheses rejected for JCM 1. In the path analyses, JCM 1 came out on top. Almost all of the proposed paths were found to be significant and all were positive. No significance negative relationships were identified, and no relationships exceeded unity. Surprisingly, skill variety was unsuccessful in its loading on experienced meaningfulness. This is perhaps due to issues identified in the measurement model.

JCM 2 displayed a host of issues in the path analysis, as seen in Table 5.3. Only four paths were found to be significant and positive, of which only three exceeded unity. There thus is only one plausible relationship from task identity to internal motivation, although it still has an inadequate loading of .4. The psychological states are indeed needed for the model to make sense.

Table 5.4 indicates the hypotheses rejected for JCM 3. Forty-six percent of the proposed hypotheses were rejected, as relationships were found to be significant and positive. The significant relationship between feedback and knowledge of results exceeded unity.

Table 5.5 shows the comparative statistics on hypotheses rejected for the models. Ultimately, the original model (JCM 1) proved the most successful. Eighty-six percent of the paths loaded significantly.

Table 5.2

Hypotheses JCM 1

	REJECTED	NOT REJECTED
Hypothesis 1: A direct linear relationship exists between *skill variety* (ξ_1) and *experienced meaningfulness of work* (η_1).		x
Hypothesis 2: A direct linear relationship exists between *task identity* (ξ_2) and *experienced meaningfulness of work* (η_1).	x	
Hypothesis 3: A direct linear relationship exists between *task significance* (ξ_3) and *experienced meaningfulness of work* (η_1).	x	
Hypothesis 4: A direct linear relationship exists between *autonomy* (ξ_4) and *experienced responsibility for work outcomes* (η_2).	x	
Hypothesis 5: A direct linear relationship exists between *feedback* (ξ_5) and *knowledge of results* (η_3).	x	
Hypothesis 6: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *internal work motivation* (η_4).	x	
Hypothesis 7: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *general job satisfaction* (η_5).	x	
Hypothesis 8: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *growth satisfaction* (η_6).	x	
Hypothesis 9: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *internal motivation* (η_4).	x	
Hypothesis 10: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *general job satisfaction* (η_5).	x	
Hypothesis 11: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *growth satisfaction* (η_6)	x	
Hypothesis 12: A direct linear relationship exists between *knowledge of results* (η_3) and *internal motivation* (η_4).		x
Hypothesis 13: A direct linear relationship exists between *knowledge of results* (η_3) and *general job satisfaction* (η_5).	x	
Hypothesis 14: A direct linear relationship exists between *knowledge of results* (η_3) and *growth satisfaction* (η_6).	x	

Table 5.3

Hypotheses JCM 2

	REJECTED	NOT REJECTED
Hypothesis 15: A direct linear relationship exists between *skill variety* (ξ_1) and *internal work motivation* (η_1).		x
Hypothesis 16: A direct linear relationship exists between *skill variety* (ξ_1) and *general job satisfaction* (η_2).		x
Hypothesis 17: A direct linear relationship exists between *skill variety* (ξ_1) and *growth satisfaction* (η_3).		x
Hypothesis 18: A direct linear relationship exists between *task identity* (ξ_2) and *internal work motivation* (η_1)	x	
Hypothesis 19: A direct linear relationship exists between *task identity* (ξ_2) and *general job satisfaction* (η_2).		x
Hypothesis 20: A direct linear relationship exists between *task identity* (ξ_2) and *growth satisfaction* (η_3).		x
Hypothesis 21: A direct linear relationship exists between *task significance* (ξ_3) and *internal work motivation* (η_1).	x	
Hypothesis 22: A direct linear relationship exists between *task significance* (ξ_3) and *general job satisfaction* (η_2)	x	
Hypothesis 23: A direct linear relationship exists between *task significance* (ξ_3) and *growth satisfaction* (η_3).	x	
Hypothesis 24: A direct linear relationship exists between *autonomy* (ξ_4) and *internal work motivation* (η_1).		x
Hypothesis 25: A direct linear relationship exists between *autonomy* (ξ_4) and *general job satisfaction* (η_2).		x
Hypothesis 26: A direct linear relationship exists between *autonomy* (ξ_4) and *growth satisfaction* (η_3).		x
Hypothesis 27: A direct linear relationship exists between *feedback* (ξ_5) and *internal work motivation* (η_1).		x
Hypothesis 28: A direct linear relationship exists between *feedback* (ξ_5) and *general job satisfaction* (η_2).		x
Hypothesis 29: A direct linear relationship exists between *feedback* (ξ_5) and *growth satisfaction* (η_3).		x

Table 5.4

Hypotheses JCM 3

	REJECTED	NOT REJECTED
Hypothesis 30: A direct linear relationship exists between *skill variety* (ξ_1) and *experienced meaningfulness of work* (η_1).		x
Hypothesis 31: A direct linear relationship exists between *skill variety* (ξ_1) and *experienced responsibility for work outcomes* (η_2).		x
Hypothesis 32: A direct linear relationship exists between *skill variety* (ξ_1) and *knowledge of results* (η_3).		x
Hypothesis 33: A direct linear relationship exists between *task identity* (ξ_2) and *experienced meaningfulness of work* (η_1).		x
Hypothesis 34: A direct linear relationship exists between *task identity* (ξ_2) and *experienced responsibility for work outcomes* (η_2).		x
Hypothesis 35: A direct linear relationship exists between *task identity* (ξ_2) and *knowledge of results* (η_3).		x
Hypothesis 36: A direct linear relationship exists between *task significance* (ξ_3) and *experienced meaningfulness of work* (η_1).	x	
Hypothesis 37: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *internal work motivation* (η_4).		x
Hypothesis 38: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *general job satisfaction* (η_5).		x
Hypothesis 39: A direct linear relationship exists between *experienced meaningfulness of work* (η_1) and *growth satisfaction* (η_6).	x	
Hypothesis 40: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *internal motivation* (η_4).		x
Hypothesis 41: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *general job satisfaction* (η_5).		x
Hypothesis 42: A direct linear relationship exists between *experienced responsibility for work outcomes* (η_2) and *growth satisfaction* (η_6)	x	
Hypothesis 43: A direct linear relationship exists between *knowledge of results* (η_3) *and internal motivation* (η_4).	x	
Hypothesis 44: A direct linear relationship exists between *knowledge of results* (η_3) and *general job satisfaction* (η_5).	x	
Hypothesis 45: A direct linear relationship exists between *knowledge of results* (η_3) and *growth satisfaction* (η_6).	x	
Hypothesis 46: A direct linear relationship exists between *task significance* (ξ_3) and *experienced responsibility for work outcomes* (η_2).	x	
Hypothesis 47: A direct linear relationship exists between *task significance* (ξ_3) and *knowledge of results* (η_3).	x	
Hypothesis 48: A direct linear relationship exists between *autonomy* (ξ_4) and *experienced meaningfulness of work* (η_1).	x	
Hypothesis 49: A direct linear relationship exists between *autonomy* (ξ_4) and *experienced responsibility for work outcomes* (η_2).		x

Hypothesis 50: A direct linear relationship exists between *autonomy* (ξ_4) and *knowledge of results* (η_3).	x	
Hypothesis 51: A direct linear relationship exists between *feedback* (ξ_5) and *experienced meaningfulness of work* (η_1).		x
Hypothesis 52: A direct linear relationship exists between *feedback* (ξ_5) and *experienced responsibility for work outcomes* (η_2).	x	
Hypothesis 53: A direct linear relationship exists between *feedback* (ξ_5) and *knowledge of results* (η_3).		x

Table 5.5

Comparative Path Statistics

	JCM 1	JCM 2	JCM 3
Hypotheses rejected	12/14	4/15	11/24

Table 5.6 indicates the comparative statistics on variance explained in the outcomes. JCM 3 generally accounted for more variance in the outcomes, followed closely by JCM 1. This fact once more suggests that the psychological states are necessary, but there is slightly more to the relationships between the job characteristics and the psychological states.

Table 5.6

Comparative Variance Statistics

	JCM 1	JCM 2	JCM 3
Internal motivation	.63	.50	.72
Job satisfaction	.85	.78	.88
Growth satisfaction	.67	.82	.69

5.2.3 DECISION

The results indicate that, without a doubt, the psychological states are necessary for the structural integrity of the JCM. The empirical findings from JCM 1 and 3 were consequently integrated. This structurally sound JCM can be seen in Figure 5.1.

The original propositions of Hackman and Oldham (1980) hold true. All the job characteristics load onto the psychological states, as previously believed. In addition,

autonomy also loads onto experienced meaningfulness. Feedback was found to be the powerhouse state and loaded quite strongly onto all three psychological states. All of the psychological states predicted the outcomes as originally prescribed by the model. Only knowledge of results did not predict internal motivation.

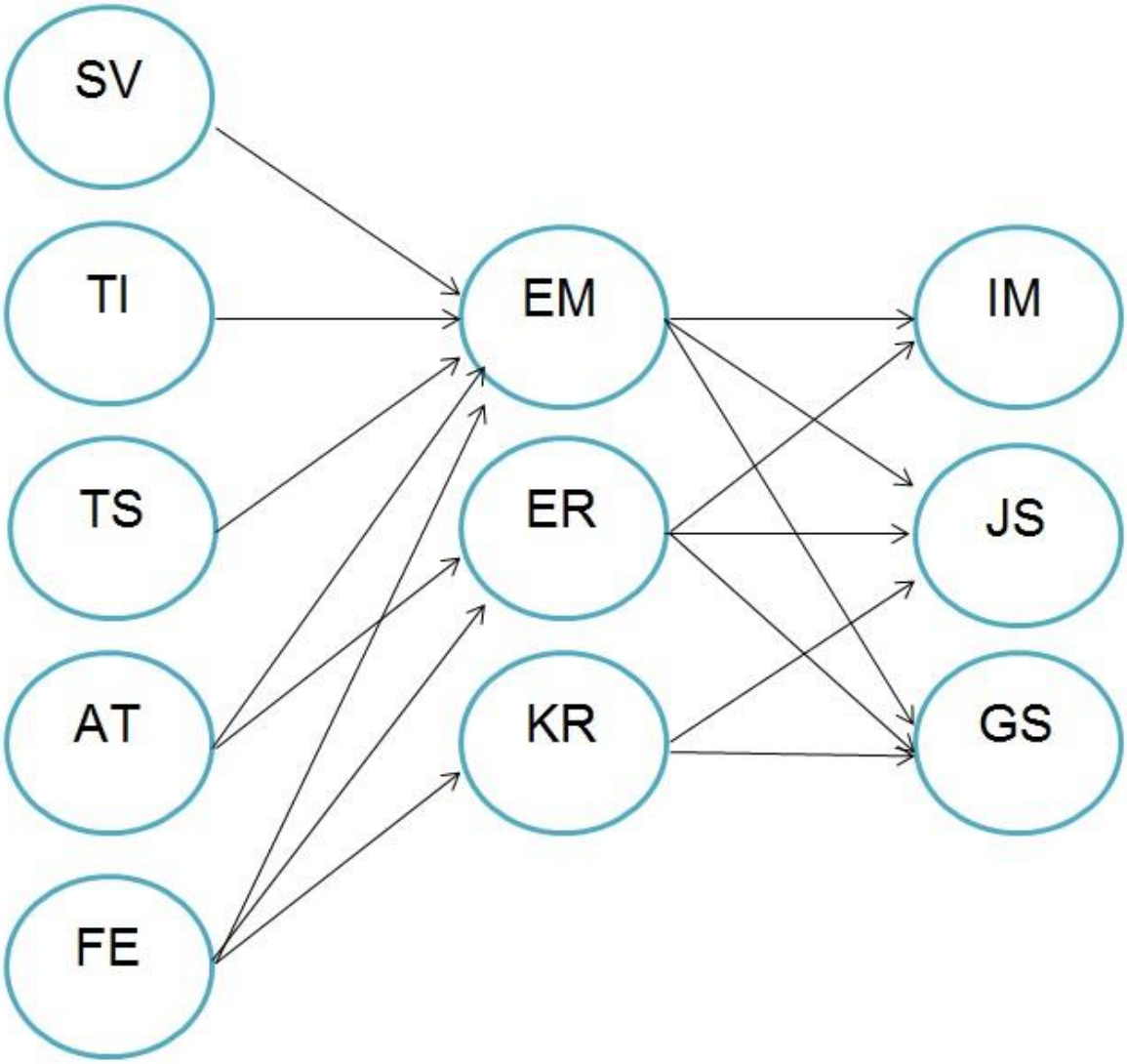


***Figure 5.1*. JCM 4**

5.3 LIMITATIONS

The limitations to the use of an ex post facto correlation design were discussed in Chapter 3 of this study. They therefore will not be repeated. The first limitation was that the measurement model did not fit the data well. Although poor fit is not the primary determinant to continue with the study, it would still have been empirically more correct to adjust the model until satisfactory fit was achieved. Although this was

done by removing job satisfaction, the fit did not improve to such an extent that it warranted its exclusion.

The second limitation was the use of students as a sample. Although the logic for the use of students was clearly stipulated in Chapter 2, and the results were strikingly similar to most norm scores, students still are not employees. It is believed, however, that this is not a major concern. The strong correlation between the norms presented in the previous section and the scores in this study essentially dispels the arguments that the JCM functions in a different manner for students.

The third limitation was the seemingly “big net” approach used in JCM 3. All the possible direct paths were accounted for by the model, which complicated the fitting of the model. This ultimately resulted in poor fit, but a positive element also emerged, namely new paths from the job characteristics to the psychological states.

5.4 PRACTICAL IMPLICATIONS

5.4.1 INTRODUCTION

HR departments currently are facing a critical challenge where they need to justify their existence in organisational life. In order to do this, HR needs to prove to the company that the interventions employed will provide a return on investment. This can be achieved by utilising theories and models that are fool proof and empirically sound.

The evidence supporting the use of the JCM cannot be refuted, and its value to industry has been documented widely. The same holds for the criticisms. They cannot simply be ignored because the supporting evidence ‘seems’ stronger. It seems as if practitioners are weighing the strengths and limitations of this model and then making a judgement based purely on which way the scales tip. This paradigm is a logical fallacy.

Academia has a responsibility to provide companies with the best possible solutions to their people-related problems and therefore needs to provide companies with empirically tested theories that provide a valid account of the underlying phenomenon. If this is done with conviction, the process of proving to companies that the JCM holds value for them will become much easier. The credibility of HR will

also increase in the eyes of industry. It is important for practitioners utilising the theory that industry is only interested in the outcomes that an investment in work design will bring.

It became clear from this study that the critical psychological states are a necessity in the model, as outcomes are predicted with much more certainty. This indicates that JCM 2 is not a plausible solution for industry to use. JCM 1 ensured that the outcomes were predicted powerfully; however, JCM 3 ensured much more supportive findings. The newly created JCM 4 therefore will be used as a base for the practical implications. The fact that JCM 4 is the chosen model does not change the implications for industry dramatically, since it closely resembles the original theory.

5.4.2 BUDGETARY FORMULA

The most important implication of the research is that job characteristic predicted the psychological states to varying degrees. This implies that the relative strengths of each characteristic should be considered when resources are allocated to job design in order to get the best possible outcomes.

The model places equal importance on each of the job characteristics' (indirect) influence on the outcomes. Although this fact is reflected in the relative weights given to each characteristic in the MPS formula, the monetary investments of companies for increasing each characteristic are equal. A popular misconception is that "we should increase all the job characteristics to ensure that outcomes are achieved". Companies therefore allocate a certain amount of resources to increase all of the job characteristics equally. This is perhaps one of the reasons why the model has failed to a certain extent in practice. It consequently is important to create a resource allocation formula that will aid companies in the process of design work. This preliminary formula is based on the relative importance each job characteristic has in predicting the outcomes, and was derived from the completely standardised gamma matrix of tests done on JCM 1 and 3. Path strengths from each job characteristic were averaged and rounded off. Jointly, these values amounted to 100. The resource allocation formula(s) can be expressed as follows:

(.15)R = Resources allocated to increasing Skill Variety

(.10)R = Resources allocated to increasing Task Identity

(.10)R = Resources allocated to increasing Task Significance

(.30)R = Resources allocated to increasing Autonomy

(.35)R = Resources allocated to increasing Feedback

The total amount of resources available for the design intervention therefore is inserted into each formula. For example, company X allocates R5 000 to job redesign interventions. Therefore:

(.15)5 000 = R750 should be allocated to increasing Skill Variety

(.10)5 000 = R500 should be allocated to increasing Task Identity

(.10)5 000 = R500 should be allocated to increasing Task Significance

(.30)5 000 = R1 500 should be allocated to increasing Autonomy

(.35)5 000 = R1 750 should be allocated to increasing Feedback

The same formula holds true for other forms of resources required for the intervention. For example, if company X allocates 200 hours of manpower to implementing the intervention, then:

(.15)200 = 30 hours should be allocated to increasing Skill Variety

(.10)200 = 20 hours should be allocated to increasing Task Identity

(.10)200 = 20 hours should be allocated to increasing Task Significance

(.30)200 = 60 hours should be allocated to increasing Autonomy

(.35)200 = 70 hours should be allocated to increasing Feedback

To ensure the best results from the intervention, companies must first create a resource budget and then insert these values into the formulas. It is strongly recommended that companies adhere strictly to the resource budgets that the formula will provide.

5.4.3 JDS

Since JCM 3 is the preferred model, the revised JDS, which measures the critical psychological states, is recommended for use. The success of the reformulation of the negatively worded items in the job characteristics (Idaszak & Drasgow, 1987), and the modifications made by Boonzaier (2001) to the outcomes, should be incorporated into the JDS. The revisions made to the negatively worded items of the psychological states by this study are also recommended for use. The final combined JDS can be seen in Appendix 2[30]. Given previous findings and the results of this study, this variation of the JDS is highly recommended for South African practitioners. It furthermore is also recommended that the MPS formula be revised in the same way as the above formulas. The overall motivating potential score should be weighted by the relevant strengths of each characteristic. A simple additive index therefore is recommended:

$$MPS = SV\ (.15) + TI\ (.10) + TS\ (.10) + A\ (.30) + F\ (.35)$$

This composite will ensure that each job characteristic is fairly represented in the total MPS score. The MPS score consequently will be a more truthful representation of the total motivating potential of a job, since it will weigh each characteristics' contribution accurately[31]. It is also believed that because the composite will be out of seven, it will be more easily interpretable.

5.4.4 JOB ENRICHMENT

This research also has implications for the manner in which the interventions to increase the outcomes are utilised. Hackman and Suttle (1977) proposed various ways in which the process of redesigning work could be undertaken (Figure 22). It was proposed that, to increase skill variety, tasks should be combined and client relationships should be established. To increase task identity and task significance, natural work units should be formed. Jobs should be expanded vertically to increase autonomy, while feedback channels should be opened to increase feedback. Other interventions also exist, such as flexitime, job rotation and job sharing.

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[30] This JDS is designed for students.
[31] This is a proposed formula; its utility still needs to be tested.

Again, it is important to note that the findings of this study suggest that all of these options still are plausible, but they should be used to varying extents. All of the interventions can once more be ranked using the formula provided in the previous section.

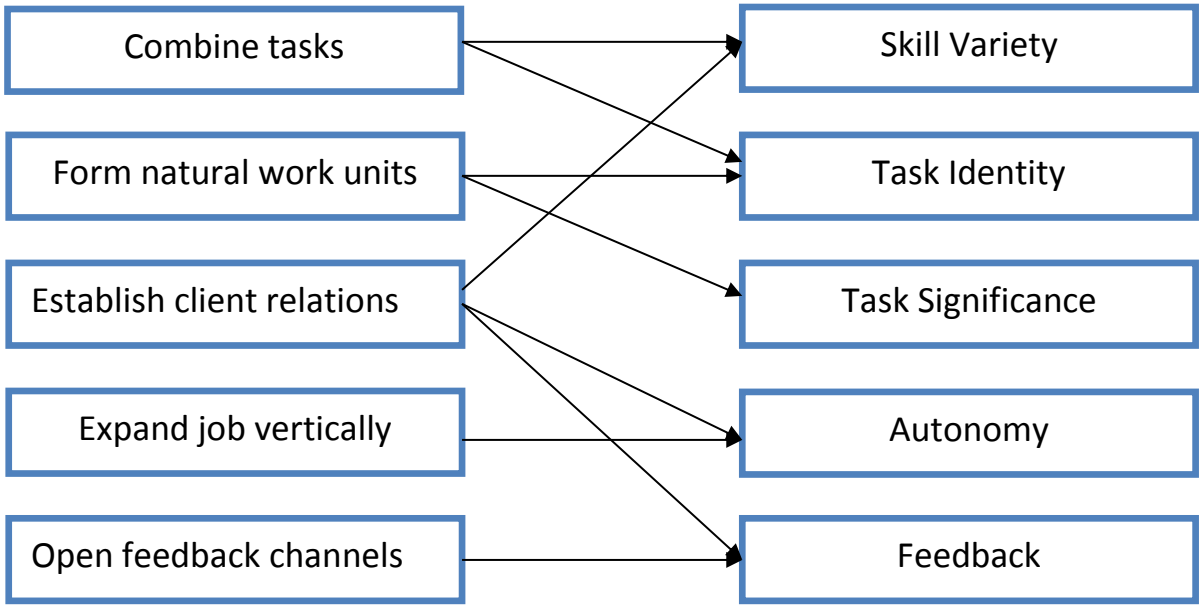

***Figure 5.2*. Guidelines for enriching jobs** (Hackman & Suttle, 1977)

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

The varying degrees of importance of each job characteristic show that these variables should be arranged differently than the original theory proposes. Excellent findings would result if variations of the job characteristics are used and tested via structural equation modelling (e.g. three-structure models).

It also is suggested that future research transforms the critical psychological states into one latent variable. The conclusion of such a study might show that the model can be simplified. It also would be interesting if an SEM study was undertaken that incorporates the moderating variables into the structural model. The omission of these variables from this study was done due to practical problems.

The reciprocal nature of some of the variables within the model should be investigated. The modification indices clearly indicate that there are plausible reciprocal relationships within the model, specifically from the outcomes to the psychological states.

Knowing that the psychological states are necessary means that research on the JCM essentially can start again. New emerging concepts can now be incorporated into the model. It is recommended that factors such as job crafting (Wezesniewski & Dutton, 2001), job demands-resources (Demerouti, Bakker, Nachreiner & Schaufeli, 2001) and psychological ownership (Pierce, Jussila & Cummings, 2008), to name a few, are tested with this model (JCM 4). Other postulations by Morgeson and Humphrey (2006) are also worth considering.

Arising from the JCM there also has been recent consensus that the social characteristics of work have a major influence on motivation at work (Grant, 2007; Morgeson & Humphrey, 2006). Interesting propositions have also surfaced when the job characteristics, and more specifically the psychological states, are combined with personality (Barrick, Mount & Li, 2013).

The organisational climate has also changed drastically since the 1970s. A changing landscape, characterised by elements such as greater flexibility, a shift in workforce composition and an expanding service sector, has arisen (DeVaro et al., 2007). Even if the JCM was validated only partially, it has to be retested to remain relevant (DeVaro et al., 2007).

5.6 CONCLUSION

As stated earlier, research on the JCM has been declining steadily. This has been due to the fact that no consensus could be reached about whether or not the model is useful. This issue was aggravated by the fact that research on the model was generally done in the 1990s, when most of the statistical technology we use today did not exist. The 21st century brought radical advances in statistical analysis packages, which would aid in settling the matter. More specifically, LISREL had not been utilised enough to test the JCM.

This study was aimed specifically at settling the disputes that arose regarding the critical psychological states. It was concluded that these variables are necessary to successfully predict the outcomes. The findings also suggest that the job characteristics load onto the psychological states differently than originally proposed, and it consequently was concluded that JCM 3 is the most useful variation of the model. A final model consequently was created and proposed. The fact that JCM 4

was the model chosen necessitated the creation of a preliminary equation that can be used to determine the importance with which each job characteristic is viewed.

The use of work design theories has provided industry with a variety of performance-related benefits. It therefore is recommended that practitioners utilise JCM 4 as a starting point for rearranging work. This will ensure that HR can effectively alter the performance of the workforce, and ultimately ensure a competitive edge for the company.

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7. APPENDIX

THE REVISED JOB DIAGNOSTIC SURVEY (JDS)

The Job Diagnostic Survey is used to diagnose jobs and how people react to them. The questionnaire is useful in determining how jobs can be designed better by obtaining information about how people react to different kinds of jobs. This instrument can however be used for other purposes too. In this specific case, it pertains to students and their courses. You will have to think about your course (e.g. BComm) to answer the questions.

On the following pages you will find several different questions relating to your course. Specific instructions are given at the start of each section. The questions are designed to obtain *your* perceptions of your course and *your* reactions to it. There are no trick questions. Your individual answers will be kept completely confidential. Please answer each item as honestly and frankly as possible.

Thank you for your co-operation.

SECTION ONE

This part of the questionnaire asks you to **describe your** course, as *objectively* as you can.

Please do ***not*** use this part of the questionnaire to show how much you like or dislike your course. Questions about that will come later. Instead, try to make your descriptions as accurate and as objective as you possibly can.

A **sample question** reads:

To what extent does your course require you to work with mechanical equipment?

1----------2----------3----------4----------5----------6----------7

Very little; the course requires almost no contact with mechanical equipment of any kind.	Moderately.	Very much; the course requires almost constant work with mechanical equipment.

If, for example, your course requires you to work with mechanical equipment a good deal of the time - but also requires some paperwork - you might indicate a number 6 on the separate answer sheet.

If you do not understand these instructions, please ask for assistance.

1. How much *autonomy* is there in your course? That is, to what extent does your course permit you to decide *on your own* how to go about doing the work?

1----------2----------3----------4----------5----------6----------7

Very little; the course gives me almost no personal "say" about how and when the work is done.	Moderate autonomy; many things are standardised and not under my control, but I can make some decisions about the work.	Very much; the course gives me almost complete responsibility for deciding how and when the work is done.

2. To what extent does your course involve doing a *"whole" and identifiable piece of work*? That is, is the course a complete piece of work that has an obvious beginning and end? Or is it only a small *part* of the overall piece of work, which is finished by other people or by automatic machines?

1----------2----------3----------4----------5----------6----------7

My course is only a tiny part of the overall piece of work; the results of my activities cannot be seen in the final product or service.	My course is a moderate-sized "chunk" of the overall piece of work; my own contribution can be seen in the final outcome.	My course involves doing the whole piece of work, from start to finish; the results of my activities are easily seen in the final product or service.

3. How much *variety* is there in your course? That is, to what extent does the course require you to do many different things at work, using a variety of your skills and talents?

1----------2----------3----------4----------5----------6----------7

Very little; the course requires me to do the same routine things over and over again.	Moderate variety.	Very much; the course requires me to do many different things, using a number of different skills and talents.

4. In general, *how significant or important* is your course? That is, are the results of your studies likely to significantly affect the lives or wellbeing of other people?

1----------2----------3----------4----------5----------6----------7

Not very significant; the outcomes of my studies are *not* likely to have important effects on other people.	Moderately significant.	Highly significant; the outcomes of my studies can affect other people in very important ways.

5. To what extent does *doing the* course *itself* provide you with information about your work performance? That is, does the actual *work itself* provide clues about how well you are doing - aside from any "feedback" lecturers may provide?

1----------2----------3----------4----------5----------6----------7

Very little; the course itself is set up so that I could work forever without finding out how well I am doing.	Moderately; sometimes doing the course provides "feedback" to me; sometimes it does not.	Very much; the course is set up so that I get almost constant "feedback" as I work about how well I am doing.

SECTION TWO

Listed below are a number of statements that could be used to describe a course.

Please indicate whether each statement is **an *accurate* or an *inaccurate* description of *your*** course.

Once again, please try to be as objective as you can in deciding how accurately each statement describes your course - regardless of whether you like or dislike your course.

Write a number on the separate answer sheet based on the following scale:

How accurate is the statement in describing your job?

1	**2**	**3**	**4**	**5**	**6**	**7**
Very Inaccurate	Mostly Inaccurate	Slightly Inaccurate	Uncertain	Slightly Accurate	Mostly Accurate	Very Accurate

1. The course requires me to use a number of complex or high-level skills.
2. The course is arranged so that I can do an entire piece of work from beginning to end.
3. Just doing the work required by the course provides many chances for me to figure out how well I am doing.
4. The course allows me to use a number of complex or high-level skills.
5. This course is one where a lot of other people can be affected by how well the work gets done.
6. The course gives me a chance to use my personal initiative and judgement in carrying out the work.
7. The course provides me with the chance to completely finish the pieces of work that I begin.
8. After I finished a subject, I know whether I performed well.
9. The course gives me considerable opportunity for independence and freedom in how I do the work.
10. The course itself is very significant and important in the broader scheme of things.

SECTION THREE

Now please indicate ***how you personally feel about your*** course***.***

Each of the statements below is something that a person might say about his or her course. Please indicate your own personal *feelings* about your course by indicating to what extent you agree with each of the statements.

Write a number on the separate answer sheet based on this scale:

How much do you agree with the statement?

1	**2**	**3**	**4**	**5**	**6**	**7**
Disagree Strongly	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Agree Strongly

1. It's easy, in this course, for me to care very much about whether or not the work gets done right.
2. My opinion of myself goes up when I do an assignment/test/module well.
3. Generally speaking, I am very satisfied with this course.
4. Most of the things I have to do in this course seem useful or important.
5. I usually know whether or not my work is satisfactory in this course.

6. I feel a great sense of personal satisfaction when I do my work well.
7. The work I do in this course is very meaningful to me.
8. I feel a very high degree of *personal* responsibility for the work I do in this course.
9. I seldom think of quitting this course.
10. I feel good and happy when I discover that I have performed well in this course.
11. It's easy for me to figure out whether I'm doing well or poorly in this course.
12. I feel I should personally take the credit or blame for the results of my work in this course.
13. I am generally satisfied with the kind of work I do in this course.
14. My own feelings are generally affected by how well I do in this course.
15. Whether or not my work gets done right is clearly *my* responsibility.

SECTION FOUR

Now please indicate **how *satisfied* you are** with each aspect of your course listed below.

Once again, indicate on the separate answer sheet the appropriate number for each statement:

How satisfied are you with this aspect of your course?

1	**2**	**3**	**4**	**5**	**6**	7
Extremely Dissatisfied	Dissatisfied	Slightly Dissatisfied	Neutral	Slightly Satisfied	Satisfied	Extremely Satisfied

1. The amount of personal growth and development I get in doing my course.
2. The feeling of worthwhile accomplishment I get from doing my course.
3. The amount of independent thought and action I can exercise in my course.
4. The amount of challenge in my course.

SECTION FIVE

Now please think of the ***other students*** in your university.

Please think about how accurately each of the statements describes **the feelings of those people about the** course.

It is quite all right if your answers here are different from when you described your *own* reactions to the course. Often different people feel quite differently about the same course.

Once again, indicate on the separate answer sheet a number based on this scale:

How much do you agree with the statement?

1	**2**	**3**	4	**5**	**6**	**7**
Disagree	Disagree	Disagree	Neutral	Agree	Agree	Agree
Strongly		Slightly		Slightly		Strongly

1. Most people in this course feel a great sense of personal satisfaction when they do the course well.
2. Most people in this course are very satisfied with the course.
3. Most people in this course feel that the work is useful or important.
4. Most people in this course feel a great deal of personal responsibility for the work they do.
5. Most people in this course have a pretty good idea of how well they are performing their work.
6. Most people in this course find the work very meaningful.
7. Most people in this course feel that whether or not the course gets done right is clearly their own responsibility.

8. People in this course seldom think of quitting.
9. Most people in this course feel good or happy when they find that they have performed the work well.
10. Most people in this course can easily figure out whether they are doing good or bad work.

THE REVISED JOB DIAGNOSTIC SURVEY (JDS) – Scoring Procedure

The **job characteristics** are scored across the following items in each respective section of the revised JDS, according to the following scheme:

Skill variety	Section one: question 3 Section two: statements 1 and 4
Task identity	Section one: question 2 Section two: statements 2 and 7
Task significance	Section one: question 4 Section two: statements 5 and 10
Autonomy	Section one: question 1 Section two: statements 6 and 9
Feedback	Section one: question 5 Section two: statements 3 and 8

Compute an **average score** for each job characteristic.

Using the **Simple Additive Index** method, compute the **Motivating Potential Score (MPS)** by adding the five individual (averaged) job characteristic scores together.

The **personal outcomes** are scored across the following items in each respective section of the revised JDS according to the following scheme:

Internal work motivation	Section three: statements 2, 6, 10 and 14 Section five: statements 1 and 9
General job satisfaction	Section three: statements 3, 9 and 13 Section five: statements 2 and 8
Growth satisfaction	Section four: statements 1, 2, 3 and 4

Compute an **average score** for each of the personal outcomes.

The **critical psychological states** are scored across the following items in each respective section of the revised JDS according to the following scheme:

Experienced meaningfulness of work	Section three: statements 4 and 7 Section five: statements 3 and 6
Experienced responsibility for outcomes	Section three: statements 1, 8, 12 and 15 Section five: statements 4 and 7
Knowledge of results	Section three: statements 5 and 11 Section five: statements 5 and 10

Compute an **average score** for each critical psychological state.