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**De Theatro Motivarum, Motivation: In Search of Essentials. Research on a Theoretical Model of the Process of Motivation and on Critical Determinants of Interference**

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# Chapter 7

## Empirical Research

### *Competencies Enabling Conditions for Intervention in the Process of Motivation*

#### 7.1. Introduction

*In Chapter 5, elementary constructs have been isolated, that present a match with elementary Phases of the Model of Motivation presented in Chapter 3, thus providing support for the Model that was assumed to represent the Process of Motivation.*

*In Pre-Fundamentals to the study, a reintroduction of inductive inference was proposed in generation of explanatory theoretical Models. Where these theoretical Models lead to clearly defined and constrained hypotheses, they constitute not a departure from, but rather a re-enrichment of hypothetico-deductive tradition.*

*In defining these hypotheses, Chapter 6 provided additional, secondary evidence in support of the Model, supplementing findings obtained in Chapter 5, whereby first insights on the Process of Interference were obtained, as called for in the Problem Statement, Chapter 2.5.*

*After observing Conditions, Chapter 7, then, is to provide descriptive empirical evidence for the second Determinant in the Process of Interference: the Competencies enabling Conditions for Intervention in the Process of Motivation. Empirical research on its associated hypotheses would constitute a second supplemental verification of the Model.*

*The objective of Chapter 7 is derived from the Problem Statement defined in Chapter 2.5.:*

- *to unveil elementary processes involved in addressing Motivation, by providing insights into the Process of Interference,*
  - *into the Competencies initiating the Conditions to come into effect, by means of:*
    - *a theoretical Model based on the Model of Motivation, as obtained through inductive inference, provided in a summarized overview,*
    - *and descriptive empirical research providing evidence of the relation between concepts presumed to be indicative of these Conditions and concepts operationalizing these Competencies,*  
*thus providing secondary empirical evidence in support of the Model of Motivation, from which these Competencies are derived.*

## 7.2. Application of the Model of Motivation *An Analysis of Competencies*

In Chapter 6, first evidence was obtained for the Conditions that were assumed to initiate a Process of Interference, as based on the explanatory theoretical Model of Motivation presented in Chapter 3. As assumed in the Fundamental Assumptions, Chapter 2.3.1., these Conditions for Intervention in the Process of Motivation are, in turn, enabled by Competencies.

Before proceeding towards empirical research, a brief presentation is provided of a theoretical Model on Competencies based on the Model of Motivation, in accordance with the Problem Statement. Reference is made to Mennes (2016, *in press*), notably Chapter 9 and Chapter 17.3., for an extensive overview.

Prior to the analysis, a brief description of Assumptions is provided.

### 7.2.1. Assumptions Preceding an Analysis of Competencies

Conditions initiating the Process of Interference were identified by reducing through a number of Assumptions, the vast universe of possible options in which the Process of Interference could be expressed, to an 8x8 matrix of possible Intervention Strategies. For further details on these Assumptions, reference is made to Appendix XXIV, Section A., notably A.2.

As briefly mentioned in Chapter 6.2.2., a recurrent pattern and algorithm was observed, which revealed the 8x8 matrix of Intervention Strategies, which conceptualized the Process of Interference in its variety of manifestations, could be divided in two antagonistic approaches. These two basic approaches in addressing, or 'Management' of Motivation were defined as two principal 'Modalities' in Management of Motivation: an Extrinsic and an Intrinsic Modality, both consisting of four distinct levels of Intervention. For further details, reference is made to Appendix XXIV, Section B., notably B.2., with concluding observations in B.2.7.

The distinction provided a platform for an inductive inference that was to lead to an identification of essential Competencies. With reference to Appendix XXXIV, Section A., notably A.2., it was assumed the inference was to pursue two distinct modes in the analysis of Competencies. From both sets of four Intervention levels, a single level was observed, that was assumed to provide the most favorable scenario within each Modality for addressing the Process of Motivation.

Thus, two optimal Modalities emerged in Management of Motivation:

- *An Extrinsic Modality in Management of Motivation:* the Modality was found to provide substantial opportunities for Control, at the expense, however, of Productivity. From four levels of Intervention, the Intervention Strategy addressing both a Phase of Expectancies and a Phase of Internally Evoked Self-Assessment (level 4) appeared to yield highest effects.

- *An Intrinsic Modality in Management of Motivation*: the Modality was found to lead to high Productivity, at the expense, however, of only limited opportunities to apply Control. From four levels of Intervention, the Intervention Strategy that withholds addressing any Phase (level 8) appeared to yield highest results.

### 7.2.2. An Analysis of Competencies

Thus, it was assumed, the inductive inference was to pursue two distinct modes in the analysis of Competencies. Furthermore, it was assumed not all Conditions could be targeted by Competencies. More specifically, it was found that Conditions of Perceived Significance, both in the objective set and related to the Actor, could not be directly affected. Only Conditions of Perceived Support and of Perceived (Mis)-Match in Mutual Perceptions, were thought could be targeted by specific Competencies.

For further details on the inductive analysis, reference is made to an abbreviated overview in Appendix XXXIV, Section B.

From the analysis, then, two distinct sets of Competencies emerged:

- For an optimal Extrinsic Modality in Management of Motivation:
  - A single Extrinsic Attitudinal Competency, defined as:
    - *An Extrinsic Attitudinal Competency, 'Dignity'*:  
Actions or activities aimed at initiating perceptions of Support in Phase 2, a Phase of Effort, by providing Unconditional Support for the Effort invested by the Individual. These actions or activities initiating perceptions of Support are conceptualized as expressions of 'Dignity' by an Actor-Intervener, and are captured in expressions of 'worth' and 'pride'.
  - Four Extrinsic Technical Competencies, defined as:
    - *A Technical Competency of Providing Extrinsic Preconditions*:  
Actions or activities aimed at initiating perceptions of a Match in Phases 1, 2 and 3, providing clarity in procedural standards and enabling circumstances, e.g. in tools, materials, contracts, and pay;
    - *A Technical Competency of Clarifying Extrinsic Outcomes*:  
Actions or activities aimed at initiating perceptions of a Match in Phase 4, by providing clarity in goals, e.g. by means of key performance indicators, or communicating priorities;
    - *A Technical Competency of Providing Active Assistance*:  
Actions or activities aimed at initiating perceptions of a Match in Phases 5, 6 and 7, by conveying the standards the Individual is to follow in initiating a successful strategy in Mechanisms of Coping. From a positive perspective these actions or activities would include praise, appreciation, agreement, consensus, eventually resulting in a delegation of tasks and responsibilities and specifically acknowledging the Individuals' contribution. Actions or activities

- aimed at providing assistance in a more negative context would include corrective, reprimanding actions or criticizing;
- *A Technical Competency of Providing Active Feedback:*  
Actions or activities aimed at initiating perceptions of a Match in Phase 8, providing specific feedback in various degrees on performance, on outcomes and results, and on consequences.
  - For an optimal Intrinsic Modality in Management of Motivation:
    - Three Intrinsic Attitudinal Competencies, defined as:
      - *An Intrinsic Attitudinal Competency, 'Respect':*  
Actions or activities aimed at initiating perceptions of Support in Phase 1, a Phase of Expectancies, by providing Unconditional Support for the Goal, or objective defined by the Individual. These actions or activities initiating perceptions of Support are conceptualized as expressions of 'Respect' by an Actor-Intervener, and are captured in expressions of 'esteem' and 'acknowledgment';
      - *An Intrinsic Attitudinal Competency, 'Dignity':*  
As stated, actions or activities aimed at initiating perceptions of Support in Phase 2, a Phase of Effort, by providing Unconditional Support for the Effort invested by the Individual. These actions or activities initiating perceptions of Support are conceptualized as expressions of 'Dignity' by an Actor-Intervener, and are captured in expressions of 'worth' and 'pride';
      - *An Intrinsic Attitudinal Competency, 'Trust':*  
Actions or activities aimed at initiating perceptions of Support in Phase 3, a Phase of Internally Evoked Self-Assessment, by providing Unconditional Support for objective and subjective assessments made by the Individual. These actions or activities initiating perceptions of Support are conceptualized as expressions of 'Trust' by an Actor-Intervener, and are captured in expressions of 'confidence' and 'belief'.
    - Four Intrinsic Technical Competencies, defined as:
      - *A Technical Competency of Clarifying Intrinsic Preconditions:*  
Actions or activities aimed at initiating perceptions of a Match in Phases 1, 2 and 3, providing clarity in preconditions as defined by the Individual. In an Intrinsic setting these preconditions originating from the Individual are sought after through listening skills of the Actor-Intervener;
      - *A Technical Competency of Clarifying Intrinsic Outcomes:*  
Actions or activities aimed at initiating perceptions of a Match in Phase 4, by assisting through a process of coaching and confrontation towards self-reflection by the Individual. The Actor-Intervener assists in providing clarity in standards of the Individual that are providing a disruption in the Process of Motivation;

- *A Technical Competency of Providing Passive Assistance:*  
Actions or activities aimed at initiating perceptions of a Match in Phases 5, 6 and 7, meant to facilitate handling the effects of Reality, using standards defined by the Individual. A strategy, consisting of Mechanisms of Coping set out by the Individual, is followed without interference or personal preferences of the Actor-Intervener;
- *A Technical Competency of Providing Passive Feedback:*  
Actions or activities aimed at initiating perceptions of a Match in Phase 8, meant to identify the cues that are provided by the Individual of perceptions of Support and non-Support. Actions or activities initiated by the Actor-Intervener are aimed at recognizing and consolidating these cues.

### 7.2.3. Conclusions

#### *Preamble to a Definition of Hypotheses*

*It is assumed the Model obtained in an analysis of Competencies, as derived from the Model of Motivation, provides an explanatory context from which elementary hypotheses can be derived, as elaborated on in Chapter 1.5.*

*The Extrinsic and Intrinsic Competencies described in the analysis of Competencies have been identified as essential to the theoretical Model. These essential constructs, then, are to be elementary in the formulation of hypotheses provided in Chapter 7.4.3.*

*In a verification of these Competencies, empirical research on these hypotheses is to reflect on the Model of Motivation, from which these Competencies are derived.*

### 7.3. Operationalization

Chapter 7, then, seeks to provide descriptive evidence for the assumed relation between both sets of Competencies, and the Conditions assumed necessary for an Intervention to occur.

Both Determinants Competencies and Conditions are to be captured into concepts that would enable an adequate verification through empirical research.

In capturing, or operationalizing, the concept of Conditions a number of approaches seem to be applicable.

The first is to have each Condition represented by one or more concepts or variables that would capture its essence. There is an important shortcoming to this approach, however, that will affect the empirical research in the present Chapter to a great extent. In defining concepts or variables that would operationalize, or capture, a specific Condition, the phrasing to be used tends to coincide with the Competencies defined to instigate these

Conditions. Competencies are, in effect, a substitution in practical terms of activities evoking those Conditions<sup>1</sup>. In addition, both Determinants are represented by concepts that reveal a considerable overlap<sup>2 3</sup>. As a consequence, high levels of co-variation are expected to occur between variables representing both entities.

Referring to Mennes (2016, *in press*), notably Chapter 11.3., an alternative approach was suggested by focusing on the objective the Conditions are aiming at: their capacity to lead to an Intervention that successfully interferes within the Process of Motivation. The approach would provide adequate evidence in demonstrating a relation between specific Competencies and the occurrence of a successful Intervention, and thus would meet standards set forth in the Problem Statement. The concepts are to be translated into quantifiable variables by means of a series of specific questions<sup>4</sup>.

## 7.4. Research Design

*The empirical research, then, seeks to provide evidence for a relation to exist between certain concepts operationalizing specific Competencies and the occurrence of a successful Intervention, aimed at by the four Conditions isolated earlier.*

*Multiple regression analysis will be used to demonstrate relations.*

*It is assumed that in capturing in broader terms the concept of Conditions, as suggested in Chapter 7.3., it is preferable to attempt representing the concept by as few variables as possible, as it greatly improves the extent at which statistical analysis will be able to provide inferences as to the adequacy of a proposed underlying theoretical Model.*

<sup>1</sup> An example is the Condition of Perceived Support, and the Extrinsic Technical Competency of Providing Active Assistance, or the Intrinsic Technical Competency of Providing Passive Assistance. Both Competencies were defined in Chapter 7.2.2. as actions or activities including praise, appreciation, agreement, respectively actions or activities aimed at assistance in Coping strategies, and are expected to be operationalized by concepts or variables revealing considerable overlap with concepts or variables capturing a Condition of Perceived Support.

<sup>2</sup> As an example, the Condition of a Match in Mutual Perceptions could be represented by a concept capturing the adequacy of management in providing guidelines and standards to employees. In defining the concept, an overlap is expected to occur with concepts associated with a Technical Competency of Clarifying Extrinsic Outcomes, which makes use of a phrasing in comparable terms.

<sup>3</sup> This is the main reason for excluding a correlational research between concepts representing Competencies and the factor scores representing the concept of Motivation. Especially factor score DEDICAT represents a cluster of concepts that contain the values of Respect and Dignity. When correlating DEDICAT with concepts capturing the Attitudinal Competencies of Respect, Dignity and Trust, one is to expect considerable degrees of co-variation between respective variables.

<sup>4</sup> No specific questionnaire was used in the research; rather these specific questions were added to existing formats. Reference is made to Chapter 7.5.2.1.



*At the same time however, a reduction in concepts increases the probability of misrepresentation. In an attempt to optimally meet both standards, a single concept will be presented with its representational properties verified.*

*A verification of these assumptions leads to a following two-fold research design:*

- *A first analysis will aim at a two-fold verification:*
  - *First of the suitability of the single concept capturing the distinct Conditions, following the analysis in Chapter 6;*
  - *Second, of the relation between the single concept and Motivation as expressed in factor scores, following the analysis in Chapter 5;*
- *A second analysis consists of an overview of relations between the single concept capturing Conditions and the more specific concepts capturing all Competencies, both Attitudinal and Technical, following an Extrinsic and Intrinsic approach using multiple regression procedures;*

*For a full overview and rationale of the research design, reference is made to Mennes (2016, in press), notably Chapter 11.4.*

#### 7.4.1. Statistics

The Problem Statement calls for descriptive research providing evidence of relations between concepts operationalizing specific Competencies and a single concept capturing the occurrence of a successful Intervention. A two-fold approach in the statistical analysis is proposed:

- A verification of assumed relations using multiple regression techniques and supplemented by a correlational analysis;
- Descriptive research providing evidence of relations using multiple regression analysis, with hierarchical regression in elaborating on distinct effects of both Attitudinal and Technical Competencies.

Although an analysis of variance provides a suitable alternative as a statistical analysis especially in the preliminary verification of assumed relations, preference is given to a regression analysis, as the approach transcends a simple comparison of means (Rosnow & Rosenthal, 2005; Rutherford, 2001), and follows a traditional approach in social sciences (Cronbach, 1957), although it is stressed at this point that both approaches can be looked upon as following conceptually a same procedure (Cohen, 1968; Howell, 2002)<sup>1</sup>.

<sup>1</sup> Basically, both analysis of variance and regression analysis seek to analyze the impact of independent variables on response variables. But while analysis of variance seeks to define the scope of variables to be included in an experiment, the regression analysis provides information on how much variation in the dependent, response variable is explained by the distinct independent variables. The emphasis on variance explained, has also determined a preference between both approaches, as it optimally expresses the evidence of a relation sought after in the Problem Statement.

### *1. Regression Analysis, Correlational Analysis*

As stated at the start of Chapter 7.4., a single concept is to capture adequately the Conditions in each specific form. This single concept is to be verified on its ability to adequately capture the Conditions in all aspects both sets of Attitudinal and Technical Competencies are aiming at. Hence, a relation is to be demonstrated between the single concept and the targeted Conditions. Specific questions are used to quantify these relations. In a regression analysis an assessment will be made of the relationship between a number of explanatory variables operationalizing each targeted Condition, and the single concept variable as a dependent or response variable. The analysis aims at establishing an indication of the strength of relations by means of a Multiple correlation coefficient and determining Standardized  $\beta$  coefficients for each explanatory variable and significance in their respective contributions, with minimal standards set at a  $p < .05$  level.

A verification of collinearity is to precede the analysis. As an indication of collinearity, inter-item correlations must be  $< .90$  (Field, 2005). Moreover, in an additional assessment of linear relationships between predictors, a Variance Inflation Factor (VIF) is to be  $< 10$ , with a Tolerance  $> .10$  (Myers, 1990).

Finally, a Durbin-Watson test is to determine correlation between adjacent residuals, with scores approximating 2 (Durbin & Watson, 1951).

As stated in Chapter 7.3., the concept is assumed to represent not only the targeted Conditions, but also to capture in broader terms the occurrence of a successful Intervention. As such, it is assumed to be related to the Process of Motivation. A verification of adequate representational properties called for in Chapter 7.4., must therefore include a confirmation of this relation between the broader concept and the Process of Motivation. Motivation is to be captured using factor scores, associated with components DEDICAT and ACHIEV, following conclusions made in Chapter 5.5.3. Establishing an indication of strength in this relation will follow a same procedure as for relations with targeted Conditions, with the exception that a relation between the single concept and distinct factor scores capturing Motivation, simplifies the regression procedure to only establishing a Pearson product-moment correlation coefficient<sup>1</sup>. An analysis of variance is to test the F-ratio with the associated significance value providing an indication of the degree of prediction of the single concept as response variable and the distinct factor scores. Significance is to meet standards set at  $p < .05$ .

Factor scores are to be defined following the methodology described in Chapter 5.7.1.1. and summarized in Chapter 5.7.2.

All regression analyses are made using standard SPSS procedures (Norusis, 1990).

<sup>1</sup> The Standardized  $\beta$  coefficient will coincide with R, as standardization eliminates  $\beta_0$  in the equation:  $\hat{Y}_z = \beta_0 + \beta x_z$ , with only one predictor variable. The equation thus becomes:  $\hat{Y}_z = \beta x_z$ , where  $\beta$  coincides with R.

## 2. Regression Analysis

The Problem Statement calls for descriptive research providing evidence of relations between concepts operationalizing distinct Competencies and a single concept presumed to be indicative of targeted Conditions. Concepts will be translated into quantifiable variables, resulting in a series of distinct questions. A subsequent regression analysis is to report the degree of linear relationship between predictor variables operationalizing both Attitudinal and Technical Competencies and a criterion variable, represented by the concept operationalizing a successful Intervention in the Process of Motivation. Both sets of Attitudinal and Technical Competencies will be observed separately, and only a hierarchical regression will be made when the data justifies the supplemental analysis to be made.

There appears to be no clear consensus in the literature about the exact specifications on presenting data obtained from regression analysis (American Psychological Association, 2001; Cohen, Cohen, West & Aiken, 2003; Field, 2005). Given the Problem Statement, the descriptive research is to provide insights into the degree of linear relationship. As such, the Standardized regression coefficients, or  $\beta$ 's, are to be reported because these  $\beta$ -weights allow one to compare the strength of each predictor variable. A t-test is to be performed on all Standardized  $\beta$ 's. A significant difference from zero is to exceed  $p < .05$ .

In addition, the Multiple correlation coefficient  $R^2$  is to be reported to assess the regression equation in a more general sense than the individual Standardized regression coefficients.  $R^2$  describes the overall proportion of variance in the criterion variable that can be explained by the linear regression equation. In a sense, a comparison is made between the Residual sum of squares  $SS_R$  obtained through the differences between the observed data and a proposed regression line, versus the Total sum of squares  $SS_T$  obtained through the differences between the observed data and a straight line representing their mean value.  $R^2$  is the resulting Model sum of squares  $SS_M$  relative to  $SS_T$ . To test whether the linear regression equation is significantly better at predicting the outcome than using a mean value, an analysis of variance is performed. The F-ratio represents the ratio of the improvement in prediction that results from fitting the equation, relative to the inaccuracy that still exists within the equation. Assessing the ratio provides in a means of establishing significance, and to test the overall fit of the regression equation, or model, and therefore to test  $R^2$ . As a criterion for significance, the regression equation is considered to have provided a significant improvement in the ability to predict the response variable when the F-ratio is significant at  $p < .05$ .

As stated, an additional  $\Delta R^2$  will be reported when accompanying hierarchical regressions are performed. In assessing whether the change in  $R^2$  is significant an analysis of variance is performed with significance levels set at  $p < .05$ .

As indicated in Chapter 7.4.1.1., an analysis of multicollinearity is to be performed together with an assessment of linear relationships and a Durbin-Watson test, preceding the regression analysis.

As Competencies have been presented theoretically as distinct sets of Extrinsic and Intrinsic Intervention Competencies, both will also be presented as distinct entities in the regression analysis. In the descriptive research, both Attitudinal and Technical Competencies will be observed in both distinct and combined settings.

We thus obtain a following scheme for the regression analysis:

- Regression analysis Extrinsic Intervention Competencies:
  - Regression analysis Attitudinal Competency
  - Regression analysis Technical Competencies
  - Regression analysis Attitudinal & Technical Competencies
- Regression analysis Intrinsic Intervention Competencies:
  - Regression analysis Attitudinal Competencies
  - Regression analysis Technical Competencies
  - Regression analysis Attitudinal & Technical Competencies

All regression analyses are made using standard SPSS procedures (Norusis, 1990).

#### 7.4.2. Sampling

Having set the requirements for obtaining an adequate descriptive research to provide evidence of relations as indicated in the Problem Statement, a next step consists of defining an adequate sample, both in location, size and content.

As stated Chapter 2.4.3.3., the empirical research is to be performed within a business environment. In approaching companies, preference is given to a single company with diverse operational activities both in production and in commercial services situated at different locations, rather than targeting multiple companies in a diversified setting. The rationale to obtain data from a single company is to allow for an assessment of effects within a comparable setting, while at a same time compensating for possible company-related operational characteristics. However, in results obtained, the choice for a single company is expected to limit the extent at which findings can be generalized to other settings. In interpreting the data, these reservations must therefore be made prominent in final discussions on results of the Studies.

For an adequate regression analysis to be performed, a minimal sample size per location is needed. Sample size depends on the strength of effect to be detected, and the power desired to detect these effects. As the estimate for a value  $R$ , obtained from regression, is dependent on the number of predictors  $k$ , and the sample size  $n$ , a number of specific criteria have been formulated in literature (Harris, 1975; Nunnally, 1978; Green, 1991; Miles & Shevlin, 2001). Given the expected  $R$  to be 0 for random data, the equation  $R=k/(n-1)$ , would suggest at least  $n \geq 100$ , for 5-7 predictors. Miles and Shevlin have provided graphs to estimate adequate sample sizes needed to achieve different levels of power, for different effect sizes, with varying numbers of predictors. Based on their estimates, for achieving a level of power of .8 (Cohen, 1988; 1992), with an expected large to medium effect, and a maximum of 10 predictors, a sample size between 60 and

150 is suggested. Green (1991) developed more elaborate formulas where both number of predictors and effect sizes are taken into account<sup>1</sup>. Given that the power for a test of a multiple regression with a medium effect size is approximately  $\geq .80$ , he defines a minimal sample of  $50 + 8k$  in testing  $R^2$ . In addition, given that the power for a test of a medium-sized partial correlation between an outcome and a predictor holding all other predictors constant would be an estimated  $.80$ , he defines a minimal sample of  $104 + k$  in testing individual predictors.

With 5 to 10 predictors, these criteria suggest a minimal sample size of approximately  $n \geq 110$ .

However, as any multiple correlation is expected to depart significantly from zero, as the number of cases becomes quite large, it is suggested to measure the smallest number of cases that has an adequate chance of revealing a relationship of a specified size (Green, 1991; Tabachnik & Fidell, 2007). In the literature, no specifications could be found for defining limitations to a sample size<sup>2</sup>. As a consequence, results are to be provided of all distinct sub-samples, with  $n \approx 110$  per sub-sample, with a provision to reduce sub-sample-sizes using ad random procedures. Especially, where effects will appear to be large, sample sizes are to be reconsidered.

Response percentages in the different groups are to exceed 70%. For each sample, a KMO analysis of sampling adequacy will be made (Kaiser, 1970).

### 7.4.3. Hypotheses

*We are to verify an assumed relation between Conditions enabling Intervention in the Process of Motivation, and a number of distinct Competencies enabling these Conditions to occur. To this end, a series of distinct questions is to be administered within a single company at various locations differing in operational activities. Within these sub-samples, multiple regression analysis is to provide a confirmation for these assumptions.*

*Prior to formulating hypotheses for testing, however, a number of observations are made.*

<sup>1</sup>  $n \geq (8/f^2) + (k - 1)$ , where  $f^2 = .02, .15, \text{ and } .35$  for small, medium and large effects. See: Green, 1991.

<sup>2</sup> Green, elaborating on the effects of power on sample sizes, states: "... larger sample sizes might be justified on issues unrelated to power. These other issues must be considered on their own merits" (Green, 1991, p. 509).

*A single concept is to capture the Conditions that are assumed to be targeted. In a first observation, it is stressed that not all Conditions are assumed can be targeted by Competencies. Referring to Chapter 7.2.2., only Conditions of Perceived Support and of Perceived (Mis)-Match in Mutual Perceptions, were thought could be targeted by specific Competencies. As such, a single concept is to capture not all Conditions, but only Conditions defined as Perceived Support and Perceived (Mis)-Match.*

*In defining the single concept capturing these targeted Conditions, it was suggested in Chapter 7.3. the concept would center on the objective the Conditions are aiming at: their capability to lead to an Intervention which successfully interferes within the Process of Motivation. The liaison with Motivation is to be verified as stated in Chapter 7.4., and factor scores ACHIEV and DEDICAT will be used to capture the Process of Motivation in this initial analysis. However, following the exposés in Chapter 3.3.2., and Chapter 6.4.3., Conditions are expected to affect Phases 5, 6, 7 and 8 to a higher extent than Phases 1, 2 and 3, resulting in expected higher correlations with DEDICAT, indicative of Phases 5, 6, 7 and 8, than expected correlations with ACHIEV, indicative of Phases 1, 2 and 3. Consequently, Components initiating Conditions are also expected to have a differential effect on both factor scores. Notably, the single concept is expected to generate higher correlations with DEDICAT than with component ACHIEV.*

*Secondly, as distinct Modalities in Intervention Strategies were assumed, a final verification of hypotheses is to be performed with a separate analysis for both Modalities, i.e. Extrinsic Intervention Competencies as opposed to Intrinsic Intervention Competencies.*

*Following these preliminary observations, and following the Research Design proposed at the start of Chapter 7.4, a number of hypotheses are to be met to provide an adequate confirmation for the assumed relation, indicated in the Problem Statement, between the two targeted Conditions enabling Intervention in the Process of Motivation, and the two Extrinsic and Intrinsic Intervention Competencies, each with their respective Attitudinal and Technical Determinants:*

- *With Conditions assumed to be captured by a single concept,*
  - *where the single concept is assumed to capture Conditions that can be addressed by Competencies defined as Perceived Support and Perceived (Mis)-Match in Mutual Perceptions, operationalized by a series of specific questions, where Conditions of Perceived Significance, both in an objective set and related to the Actor, are assumed can not be targeted,*
  - *where the single concept is assumed to capture also the occurrence of a successful Intervention in the Process of Motivation, primarily displayed in relation to component DEDICAT, rather than component ACHIEV, that are both assumed to capture the Process of Motivation,*
- *with Extrinsic and Intrinsic Intervention Competencies assumed to be captured through a series of questions, thus enabling a quantification of effects,*

*following hypotheses are formulated:*

- *Extrinsic Intervention Competencies:*
  - a) *Hypothesis 1A (H1A): It is hypothesized that the Extrinsic Attitudinal Competency is positively related to the single concept capturing both targeted Conditions.*
  - b) *Hypothesis 1B (H1B): It is hypothesized that Extrinsic Technical Competencies are positively related to the single concept capturing both targeted Conditions.*
- *Intrinsic Intervention Competencies:*
  - a) *Hypothesis 2A (H2A): It is hypothesized that Intrinsic Attitudinal Competencies are positively related to the single concept capturing both targeted Conditions.*
  - b) *Hypothesis 2B (H2B): It is hypothesized that Intrinsic Technical Competencies are positively related to the single concept capturing both targeted Conditions.*

*Where a 'positive relation' is defined as:*

- *all Multiple correlation coefficients of the distinct regression analyses significant at  $p < .05$ , and a significant difference from zero exceeding  $p < .05$  on at least 2/3 of all t-tests performed on separate Standardized  $\beta$ 's in these various regression analyses.*

*Given the initial assumptions stated Chapter 7.4., when these hypotheses are met, it is assumed that a descriptive evidence will have been provided of a relation between Conditions assumed to be targeted and Competencies defined to successfully address these Conditions, as indicated in the Problem Statement, Chapter 2.5.*

*A confirmation of these hypotheses will provide secondary empirical evidence in support of the Model of Motivation, from which these Competencies are derived.*

#### 7.4.4. Conclusions

*A single concept is to represent two Conditions, presumed to be targeted by two sets of Competencies: Extrinsic and Intrinsic sets of Attitudinal and Technical Competencies. Empirical research will be aimed at providing descriptive evidence of a relation between this single concept and concepts presumed indicative of the Extrinsic and Intrinsic sets of Attitudinal and Technical Competencies. Prior to the analysis, a verification is to be made of alleged relations between the single concept and targeted Conditions on the one hand, the Process of Motivation on the other.*

*As a summary, then, a following research design is proposed:*

- *Study 10: Preliminary Analyses*
  - *I. Conditions*
  - *II. The Process of Motivation*
- *Study 11: Regression Analyses: aimed at verification of H1A, H1B, H2A and H2B.*

## 7.5. Empirical Research

### 7.5.1. Study 10: Preliminary Analyses

*The study is aimed at verifying the alleged relation between the single concept that is to capture the two Conditions, and its relation to the Process of Motivation, in order to provide input for descriptive research, aimed at verification of H1A and H1B, H2A and H2B in Chapter 7.5.2.*

#### *1. Methodology*

*Sample;* Following the observations made in Chapter 7.4.2., a single company, Company XXII, was approached for the empirical research. A short description of Company XXII is provided in Appendix XXXVI. Data sampling for a subsequent Study 11 was performed December 2004 – January 2005. However, the data obtained from this sampling did not allow for a verification of the single concept in relation to concepts operationalizing both Conditions and factor scores capturing the Process of Motivation, as these data were omitted from the questionnaire used at the time. Company XXII was therefore approached a second time at the end of 2007, to allow for these supplemental analyses. The Company graciously allowed for a number of questions to be supplemented to a questionnaire handed out in January 2008.

A random sample was taken at the three locations corresponding to the three locations where the previous data samples were taken, as described in Study 11, Chapter 7.5.2.1.

Details of this second data sample enabling the supplemental Preliminary Analyses in the present Study, are provided in Table 7.1.

<i>Sampling date</i>		<i>Original Sample</i>		
		<i>n</i>	<i>N</i>	<i>Response</i>
		<i>Abs</i>	<i>Abs</i>	<i>%</i>
<i>Netherlands</i>				
1	<i>Company XXII</i>			
	<i>Location 01</i>	<i>01-2008</i>	43	45 95.6%
	<i>Location 02</i>	<i>01-2008</i>	48	50 96.0%
	<i>Location 03</i>	<i>01-2008</i>	69	75 92.0%
	<i>Totals</i>		160	170 94.1%

*Notes:*  
*Sub samples consisted of Business Units within larger company*

*Table 7.1.*  
*Summarized sampling characteristics of the Preliminary Analyses Research sample*

*Procedure;* Questionnaires containing evaluative items on a training program were



supplemented with questions capturing the targeted Conditions, the single concept and the HF2.01 questionnaire used to generate the factor scores associated to components DEDICAT and ACHIEV. The resulting questionnaire was handed out to a random sample of populations at the three locations, targeted earlier in the analysis of the Study 11 data.

*Measures:* As stated in Chapter 7.4.1.1., a single concept was assumed to represent not only specific targeted Conditions, but also to capture in broader terms the occurrence of a successful Intervention.

In a two-fold verification, to this aim, following constructs were defined:

- *Single concept:* As indicated Chapter 7.3., and detailed in Chapter 7.4.3., the concept was to center on the objective the Conditions are aiming at: an Intervention which successfully interferes within the Process of Motivation. In capturing the single concept, a question was formulated following the guiding principle in phrasing of questions elaborated on earlier in Chapter 6.5.1.2.II., where the respondent was asked to evaluate a status quo in terms of a qualification or perceived satisfaction, with the Intervention performed by an External-Actor.

The dependent variable meeting these criteria, was defined as follows<sup>1</sup>:

- Variable CAPTURED\_CONDITIONS, consisting of a single item referenced as: Suppl-a

For a description of the item, reference is made to Appendix XXXV.

- *Conditions.* Following the exposé in Chapter 7.4.3., two Conditions were to be targeted: Conditions of Perceived Support and of Perceived (Mis)-Match in Mutual Perceptions. Both Conditions, as independent variables in Study 10, were defined as follows:

- Condition PERCEIVED\_MATCH, consisting of items referenced as: Suppl-b, Suppl-c
- Condition PERCEIVED\_SUPPORT, consisting of items referenced as: Suppl-d, Suppl-e

For a full description of items and references, see Appendix XXXV.

- *Process of Motivation.* The Process of Motivation was captured using the outcomes of Chapter 5, with components DEDICAT and ACHIEV represented by their respective factor scores, with essential items defined as follows:

<sup>1</sup> Strictly speaking, as no controlled experiment was performed, the concept of a dependent and independent variable is inaccurate in regression analysis. Instead, variables are measured simultaneously and without strict control (Field, 2005). However, in adapting to current practice, the concepts are used to designate response or outcome variable versus explanatory or predictor variables.

- Component DEDICAT, consisting of items referenced as: ce, cf, cg, ci, cs, ct, dz and eb from questionnaire HF 2.01
- Component ACHIEV, consisting of items referenced as: at, au, av, ba, bb and bc from HF 2.01

For a full description of these references used in designating items, see Appendix III, Section B., or Table 5.3., for an abridged overview. The HF-2.01 questionnaire was used to generate factor scores associated to components DEDICAT and ACHIEV, as described in Chapter 5.7.1.1., summarized in Chapter 5.7.2.

*Analysis;* Following Chapter 7.4.1.1., the Preliminary Analyses were performed in two phases:

- A regression analysis was performed to assess the relationship between the variable CAPTURED\_CONDITIONS as dependent or response variable, and both Conditions PERCEIVED\_MATCH and PERCEIVED\_SUPPORT separately, each with their distinct explanatory variables. In the analysis a distinction was made between both Conditions, as in the subsequent Study 11 the response variable was assumed to represent each Condition separately, in its own distinct properties.
- A simple regression was performed with a standard Pearson product-moment correlation to assess the relationship between variable CAPTURED\_CONDITIONS and both factor scores DEDICAT and ACHIEV capturing Motivation. In the analysis a distinction was made between both factor scores, following conclusions made in Chapter 5.5.3., as both were assumed to represent a distinct aspect in the Process of Motivation, in its own distinct properties. Factor scores were defined following the methodology described in Chapter 5.7.1.1. and summarized in Chapter 5.7.2.

Correlations were considered to be valid in defining an assumed relation, when significant at a standard  $p < .05$  level, following criteria set in Chapter 7.4.1.1.

All assessments were made using standard SPSS procedures (Norusis, 1990).

## *2. Results*

### *1. Conditions*

The data-set obtained from a renewed sampling in 2008, consisted of three sets obtained at three locations, in parallel to the 2005 data used in Study 11. With a total sample of  $n=160$ , a preliminary criterion for sampling size, defined Chapter 7.4.2., was met. A Cronbach alpha for the Suppl-a through Suppl-e variable set was obtained of .62, indicating a moderately adequate reliability (Kline, 1999)<sup>1</sup>.

<sup>1</sup> A moderate reliability was obtained, probably due to the limited number of items in the variable set (Cortina, 1993).

Variables		Regression Analysis (3) (4)			
Ref.	Item	R <sup>2</sup>	F	β	t (5)
(1)	(2)	(6)	(6)	(6)	(6)
1.	<u>Condition: Perceived Match</u>	.071	5.77 **		
	Suppl-b Company goal interference			-.22	-2.70 **
	Suppl-c Changing personal goals			-.11	-1.41
2.	<u>Condition: Perceived Support</u>	.558	98.35 ***		
	Suppl-d Performance manager			.59	9.83 ***
	Suppl-e Recognition manager			-.26	-4.38 ***

Notes:

(1) Reference used

(2) Abbreviated item; for a full overview of items refer to Appendix XXXV

(3) Data sample n = 160 with listwise deletion of missing values

(4) Response variable: Suppl-a: Encouragement manager to perform

Suppl-a is regressed on variables Suppl-b and Suppl-c in Section 1, on variables Suppl-d and Suppl-e in Section 2

(5) R<sup>2</sup> = Multiple correlation coefficient F = F statistic of the regression analysis

β = Standardized beta coefficient t = t statistic of the beta coefficient

(6) \* Statistic significant at the 0.05 level.

\*\* Statistic significant at the 0.01 level.

\*\*\* Statistic significant at the 0.001 level.

Table 7.2.  
Results of Regression Analysis of the single variable CAPTURED\_CONDITIONS  
on Condition PERCEIVED\_MATCH in Section 1,  
on Condition PERCEIVED\_SUPPORT in Section 2

An overview of descriptive statistics for the selected variables is provided in Appendix XXXVII, an overview of inter-item correlations in Appendix XXXVIII.

Table 7.2. contains an overview of the regression analysis performed, where the single concept variable CAPTURED\_CONDITIONS was regressed on a set of two variables operationalizing PERCEIVED\_MATCH, i.e. Suppl-b and Suppl-c in Section 1, and a second set of variables operationalizing PERCEIVED\_SUPPORT, i.e. Suppl-d and Suppl-e in Section 2.

To assess the relation between the Condition of a Perceived Match, and the single concept variable, CAPTURED\_CONDITIONS was regressed onto Suppl-b and Suppl\_c. With no inter-item correlations >.9 between explanatory variables, no indications of multi-collinearity were found (Appendix XXXVIII), with Tolerance and VIF values well within limits initially defined in Chapter 7.4.1.1<sup>1</sup>. With only two explanatory variables, the Durbin-Watson was slightly below standard, although at an acceptable level at 1.73. The Multiple correlation coefficient provided a good estimate of the proportion of variance in the single concept variable, explained by the linear regression. The model explained 7 percent of variance, R<sup>2</sup>=.071, with p<.01, thus meeting criteria initially set in Chapter 7.4.1.1. The respective explanatory variables, however, contributed differently to these

<sup>1</sup> For both explanatory variables VIF values were 1.05, the Tolerance statistic .95.

outcomes. Variable Suppl-b differed significantly from zero, with a Standardized  $\beta$  coefficient  $-.22$ , thus providing a significant contribution, whereas Suppl-c, with a  $\beta$  coefficient  $-.11$  only, did not contribute significantly. Although the number of explanatory variables was very limited in this first analysis, these findings justified analysis of the larger total sample size, based on Green's indications elaborated on earlier in Chapter 7.4.2<sup>1</sup>. However, as a consequence, no further analyses were performed involving smaller sub-samples at Locations 01, 02 and 03.

In Section 2, the single concept variable was regressed onto Suppl-d and Suppl-e, capturing the Condition of Perceived Support. Inter-item correlations were substantially higher, but no indications of multicollinearity were found (Appendix XXXVIII), with Tolerance and VIF values within limits defined<sup>2</sup>. The Durbin-Watson test provided no indication of correlated residuals for any two observations, with a 2.02 score. A high Multiple correlation coefficient was obtained,  $R^2=.558$ , with an F-ratio significant at  $p<.001$ , thus meeting criteria initially set. Explanatory variables yielded high Standardized  $\beta$  values,  $.59$  for Suppl-d,  $-.26$  for Suppl-e, both demonstrating significant effects on the single concept variable. These findings, however, justified a further analysis involving smaller samples. Appendix XXXIX contains the outcomes obtained from the three sub-samples at their respective locations<sup>3</sup>.  $R^2$  varies between  $.476$  and  $.681$ , with F-ratio's significant at  $p<.001$ , indicating the linear regression equation significantly improved predicting the outcome. However, within these smaller sub-samples, the contribution of variable Suppl-e appeared to be less prominent than variable Suppl-d, with  $\beta$  values differing significantly from zero within all sub-samples at  $p<.001$ .

*Summarizing, first findings from a Preliminary Analysis where the single concept variable CAPTURED\_CONDITIONS was regressed onto two sets of explanatory variables capturing Conditions PERCEIVED\_MATCH and PERCEIVED\_SUPPORT, seem to support the initial assumptions made in Chapter 7.4.3. of a relation existing between these Conditions and the single concept as outcome variable.*

<sup>1</sup> Where  $n \geq (8/f^2) + (k - 1)$ , with  $f^2 = R^2 / (1 - R^2)$ , an adequate sample size would be  $n \geq 105$  (Green, 1991).

<sup>2</sup> For both variables Suppl-d and Suppl-e VIF values were 1.27, the Tolerance statistic .79.

<sup>3</sup> The distinct sub-sample sizes are, however, still large according to Green's theorem: with  $f^2 = R^2 / (1 - R^2)$ , extrapolated an adequate sample size would be  $n \geq 8$  (Green, 1991).

Variables		Regression Analysis (3) (4)			
Ref.		R <sup>2</sup>	F	β	t
(1)	(2)	(5)	(6)	(6)	(6)
1.	<u>Motivation: component DEDICAT</u> DEDICAT Factor score	.099	17.30 ***	-.31	-4.16 ***
2.	<u>Motivation: component ACHIEV</u> ACHIEV Factor score	.012	1.97	.11	1.40

Notes:

- (1) Reference used
- (2) Factor scores capturing the Process of Motivation; for a summarized overview refer to Chapter 5.5.3.
- (3) Data sample n = 160 with listwise deletion of missing values
- (4) Response variable: Suppl-a: Encouragement manager to perform  
Suppl-a is regressed on factor scores DEDICAT in Section 1, and ACHIEV in Section 2
- (5) R<sup>2</sup> = Multiple correlation coefficient F = F statistic of the regression analysis
- (6) β = Standardized beta coefficient t = t statistic of the beta coefficient
- \* Statistic significant at the 0.05 level.
- \*\* Statistic significant at the 0.01 level.
- \*\*\* Statistic significant at the 0.001 level.

Table 7.3.  
Results of Regression Analysis of the single variable CAPTURED\_CONDITIONS  
on factor score DEDICAT in Section 1,  
on factor score ACHIEV in Section 2

## II. The Process of Motivation

The HF2.01 questionnaire was used on the n=160 sample, to provide data for a second Preliminary Analysis. A Cronbach alpha was obtained of .79 on this dataset, indicating an adequate reliability (Kline, 1999)<sup>1</sup>.

Table 7.3. presents an overview of the second regression analysis, where the single concept variable CAPTURED\_CONDITIONS was regressed on factor score DEDICAT in Section 1, and on factor score ACHIEV in Section 2.

In the single variable regression analysis, R<sup>2</sup> becomes the squared Pearson product-moment correlation coefficient *r*, as indicated Chapter 7.4.1.1. With R<sup>2</sup>=.099, factor score DEDICAT accounted for almost 10% of the variation in the single concept variable<sup>2</sup>. The F-ratio for the regression equation was significant at p<.001. The associated β value differed significantly from zero, and thus provided a significant contribution to the outcome.

<sup>1</sup> A single variable, referenced as variable aj (see Appendix III, Section B.), was omitted from the listing as it greatly reduced reliability scores. The variable had a minor influence both on factor scores DEDICAT and ACHIEV, with a factor score coefficient of 0.011 and -0.006 respectively, in defining the final factor score as set forth in Chapter 5.7.1.1.

<sup>2</sup> No multicollinearity tests are performed, as, per definition, in the regression only a single explanatory variable is observed.

The analysis of factor score ACHIEV provided no evidence of a significant relation. With  $R^2=.012$ , ACHIEV accounted for only 1.2% of variation in the single concept variable, and consequently the F-ratio failed to be significant, as was the associated  $\beta$  value.

*These findings, where the single concept variable CAPTURED CONDITIONS was regressed onto factor scores DEDICAT and ACHIEV, suggest that a relation exists between the concept and the Process of Motivation captured in component DEDICAT, but that no relation seems apparent with component ACHIEV. These outcomes are in line with assumptions made in Chapter 7.4.3.*

### *3. Discussion*

Although not all explanatory variables appeared to provide a significant contribution, the single concept variable suggested in Chapter 7.3., and detailed in Chapter 7.4.3., was significantly correlated to the two Conditions it was meant to represent. Moreover, a relation with component DEDICAT, capturing Motivation, appeared to be evident.

However, despite these findings, a number of limitations are to be reiterated prior to formulating first conclusions.

Foremost, the sample had a limited representativity, with only one company involved, at three Western-European locations.

Despite these limitations, the size of the sample could still have been too large, in cases where large correlations were obtained causing excessive power as a result of the sample containing too many subjects. Although the analysis provided in a reduction of the sampling size, these effects could have influenced outcomes.

Finally, limitations apply as a result of using questionnaire HF2.01, elaborated on earlier notably Chapter 5.5.1.3., and of the phrasing used in defining both explanatory and outcome variables.

### *4. Conclusion*

*The Preliminary Analysis aimed at verifying the relation between the single concept and the two Conditions it was to capture in subsequent descriptive research: Conditions of Perceived (Mis)-Match in Mutual Perceptions and of Perceived Support. Moreover the analysis was to verify the relation, especially with DEDICAT, capturing the Process of Motivation.*

*The results of both sets of analyses provide support for these relations and justify the use of the single concept suggested in Chapter 7.3., and detailed in Chapter 7.4.3., as outcome variable in a next stage of the empirical research.*

### 7.5.2. Study 11: Regression Analyses

*After having verified the representational properties of the single concept that is assumed to capture the Conditions initiating an effective Intervention in the Process of Motivation, the present Study is to verify the relation of the concept with two sets of explanatory variables capturing the Attitudinal and Technical Competencies associated to both Extrinsic and Intrinsic Intervention Modalities.*

*As such, Study 11 aims at a verification of hypotheses H1A, H1B, and H2A, H2B, as defined Chapter 7.4.3.*

*Reflecting on both sets of hypotheses it is noted that a distinction is made in Extrinsic and Intrinsic Intervention Competencies, following the observations from Chapter 7.4.3., where both are considered to be distinct Modalities in Management of Motivation. Within each Modality the Attitudinal and Technical Competencies will be observed in both distinct and combined settings.*

#### 1. Methodology

*Sample:* A single company, Company XXII, was approached, following the observations made in Chapter 7.4.2., with diverse operational activities situated at distinct locations. Data sampling was performed during December 2004 – January 2005.

A short description of Company XXII is provided in Appendix XXXVI. A sample was taken at three locations, reflecting divergence in operational activities. Details are provided in Table 7.4.

		Sampling date	Original Sample		
			n	N	Response
			Abs	Abs	%
<i>Netherlands</i>					
1	Company XXII				
	Location 01	12-2004	247	263	93.9%
	Location 02	12-2004	188	251	74.9%
	Location 03	12-2004	115	118	97.5%
	Totals		550	632	87.0%

*Notes:*  
Sub samples consisted of Business Units within larger company

Table 7.4.  
Summarized sampling characteristics of the Regression Analyses Research sample

*Procedure*; Questionnaires were handed out containing items capturing the single concept and items operationalizing the Attitudinal and Technical Competencies, covering both Extrinsic and Intrinsic Modalities. The questionnaire containing the items was handed out to the entire population at the three locations of Company XXII, participating in the Study. A classroom setting was used, yielding a 87% response on average.

*Measures*; A single concept was assumed to represent the two specific Conditions that are addressed by Attitudinal and Technical Competencies, in two distinct Modalities. The regression analyses were aimed at obtaining a descriptive evidence of the assumed relation between the single concept and two sets of explanatory variables capturing these Attitudinal and Technical Competencies associated to both Extrinsic and Intrinsic Modalities.

Following a scheme suggested in Chapter 7.4.1.2., to this end, following constructs were defined:

- *Single concept*: Following the outcomes of Study 10, a single concept was found to be indicative of the two targeted Conditions, called for in the Problem Statement, aimed at initiating a successful Intervention in the Process of Motivation.

The dependent variable that appeared to meet these criteria, was defined as follows:

- Variable CAPTURED\_CONDITIONS, consisting of a single item referenced as: Suppl-a

In formulating the concept, reference is made to Chapter 7.5.1.1., for a description of the item, see Appendix XXXV, restated in Appendix XL, Appendix XLV, Appendix L and Appendix LV.

- *Extrinsic Attitudinal Competencies*. Following the overview in Chapter 7.2.2., a single Extrinsic Attitudinal Competency was defined. The Competency was considered to be the independent variable in the first regression analysis of Study 11, and was defined as follows:

- Extrinsic Attitudinal Competency, consisting of:
  - Extrinsic Attitudinal Competency 1, *Dignity*, consisting of items referenced as: Suppl-n, Suppl-o

For a full description of these referenced items, see Appendix XL.

- *Extrinsic Technical Competencies*. Following the overview in Chapter 7.2.2., four Extrinsic Technical Competencies were defined. These four Competencies were analyzed as independent variables in the second regression analysis of Study 11, and were defined as follows:

- Extrinsic Technical Competencies, consisting of:
  - Extrinsic Technical Competency 1, *a Technical Competency of Providing Extrinsic Preconditions*, consisting of items referenced as: Suppl-f, Suppl-g



- Extrinsic Technical Competency 2, a *Technical Competency of Clarifying Extrinsic Outcomes*, consisting of items referenced as: Suppl-h, Suppl-i
- Extrinsic Technical Competency 3, a *Technical Competency of Providing Active Assistance*, consisting of items referenced as: Suppl-j, Suppl-k
- Extrinsic Technical Competency 4, a *Technical Competency of Providing Active Feedback*, consisting of items referenced as: Suppl-l, Suppl-m

For a full description of these items and references, see Appendix XLV.

- *Intrinsic Attitudinal Competencies*. Following the overview in Chapter 7.2.2., three Intrinsic Attitudinal Competencies were defined. These three Competencies were considered to be the independent variables in the third regression analysis of Study 11, and were defined as follows:

- Intrinsic Attitudinal Competencies, consisting of:
  - Intrinsic Attitudinal Competency 1, *Respect*, consisting of a single item referenced as: Suppl-w
  - Intrinsic Attitudinal Competency 2, *Dignity*, consisting of items referenced as: Suppl-n, Suppl-o, as mentioned under Extrinsic Attitudinal Competency 1
  - Intrinsic Attitudinal Competency 3, *Trust*, consisting of a single item referenced as: Suppl-x

For a full description of these items and references, see Appendix L.

- *Intrinsic Technical Competencies*. Following the overview in Chapter 7.2.2., four Intrinsic Technical Competencies were to be targeted. These four Competencies were analyzed as independent variables in the fourth regression analysis of Study 11, and were defined as follows:

- Intrinsic Technical Competencies, consisting of:
  - Intrinsic Technical Competency 1, a *Technical Competency of Clarifying Intrinsic Preconditions*, consisting of items referenced as: Suppl-p, Suppl-q, Suppl-r
  - Intrinsic Technical Competency 2, a *Technical Competency of Clarifying Intrinsic Outcomes*, consisting of a single item referenced as: Suppl-s
  - Intrinsic Technical Competency 3, a *Technical Competency of Providing Passive Assistance*, consisting of items referenced as: Suppl-t, Suppl-u
  - Intrinsic Technical Competency 4, a *Technical Competency of Providing Passive Feedback*, consisting of a single item referenced as: Suppl-v

For a full description of these items and references, see Appendix LV.

*Analysis*; With the two sets of hypotheses *H1A*, *H1B* and *H2A*, *H2B* to be verified according to Chapter 7.4.3., and following a distinction made in both Extrinsic and Intrinsic Intervention Competencies, a following scheme for the regression analyses was used, following observations made in Chapter 7.4.1.2.:

- Regression analysis Extrinsic Intervention Competencies:
  - Regression analysis Attitudinal Competency

- Regression analysis Technical Competencies
- Regression analysis Attitudinal & Technical Competencies
- Regression analysis Intrinsic Intervention Competencies:
  - Regression analysis Attitudinal Competencies
  - Regression analysis Technical Competencies
  - Regression analysis Attitudinal & Technical Competencies

Following criteria set in Chapter 7.4.1.2., a t-test was performed on all Standardized  $\beta$ 's. A significant difference from zero was to exceed  $p < .05$ . In addition, a Multiple correlation coefficient  $R^2$  was to assess the regression equation in a more general sense, with the equation considered to have provided a significant improvement in the ability to predict the response variable when the F-ratio was significant at  $p < .05$ . An additional  $\Delta R^2$  was reported in the hierarchical regressions. To assess significance in the observed change an analysis of variance was performed with significance levels set at  $p < .05$ .

All assessments were made using standard SPSS procedures (Norusis, 1990).

## *2. Results*

The regression analyses were aimed to fit a predictive linear model to the data, and to use the model to predict values of the dependent variable Suppl-a from the set of independent predictor variables representing the Attitudinal and Technical Competencies in both Extrinsic and Intrinsic Modalities.

The data-set consisted of three sets obtained at three locations within Company XXII. Total sample size was  $n=550$ , with an average response exceeding 85%, thus meeting criteria set in Chapter 7.4.2.

### *1. Extrinsic Attitudinal Competency*

In analyzing the single Extrinsic Attitudinal Competency a Cronbach alpha was obtained from variables Suppl-a, Suppl-n and Suppl-o of .86, indicating a high reliability of the data-set (Kline, 1999). A full description of these items is provided in Appendix XL, introductory descriptive statistics are provided in Appendix XLI, with inter-item correlations in Appendix XLII.

Results of the regression analysis are presented in Table 7.5., where the single concept variable was regressed on a set of two variables, Suppl-n and Suppl-o, operationalizing the single Extrinsic Attitudinal Competency, Dignity.

Variables		Regression Analysis (3) (4)			
Ref.	Item	R <sup>2</sup>	F	β	t
(1)	(2)		(6)		(6)
1.	<u>Attitudinal Competency 1</u>	.580	363.73 ***		
	Suppl-n Appreciation contribution			.55	12.89 ***
	Suppl-o Appreciation			.25	5.86 ***

Notes:

- (1) Reference used
- (2) Abbreviated item; for a full overview of items refer to Appendix XL
- (3) Data sample n = 530 with listwise deletion of missing values
- (4) Response variable: Suppl-a: Encouragement manager to perform  
Suppl-a is regressed on variables Suppl-n and Suppl-o
- (5) R<sup>2</sup> = Multiple correlation coefficient F = F statistic of the regression analysis  
β = Standardized beta coefficient t = t statistic of the beta coefficient
- (6) \* Statistic significant at the 0.05 level.  
\*\* Statistic significant at the 0.01 level.  
\*\*\* Statistic significant at the 0.001 level.

Table 7.5.  
Results of Regression Analysis of the single variable CAPTURED\_CONDITIONS  
on the single Extrinsic Attitudinal Competency

Following the inter-item correlation matrix, no indications of multi-collinearity were found. Tolerance and VIF values were well within limits initially set in Chapter 7.4.1.1<sup>1</sup>. The Durbin-Watson statistic 2.04 was close to a standard 2. According to Table 7.5., both variables, operationalizing the Attitudinal Competency correlated highly with the single concept analyzed in Study 10, Chapter 7.5.1., capturing the essential Conditions for Motivation to occur: R<sup>2</sup>=.580 (p<.001).

In an analysis of both explanatory variables Suppl-n and Suppl-o, both appeared to contribute significantly to the model (p<.001).

These findings were confirmed in an additional analysis on reduced sample sizes, following observations referred to earlier by Green in Chapter 7.4.2., with reference to Appendix XLIV<sup>2</sup>. At all three distinct locations of the data-set, both parameters contributed significantly, with variable Suppl-n providing highest contributions with β-values around .55, as compared to around .25 for Suppl-o.

*In summary, the single Extrinsic Attitudinal Competency appeared to contribute significantly to the model, both in general terms (R<sup>2</sup>=.580, p<.001), and in observations of distinct explanatory variables, thus supporting hypothesis H1A, as defined Chapter 7.4.3.*

<sup>1</sup> For the Extrinsic Attitudinal Competency explanatory variables, a VIF value 2.32 was obtained for Suppl-n and Suppl-o, the Tolerance statistic was .43.

<sup>2</sup> An overview of associated inter-item correlations is provided Appendix XLIII.

Variables		Regression Analysis (3) (4)					(5)
Ref.	Item	R <sup>2</sup>	ΔR <sup>2</sup>	F	β	t	
(1)	(2)			(6)		(6)	
1.	<u>Step 1: Technical Competency 1</u>	.137		39.76 ***			
	Suppl-f Salary				.20	4.50 ***	
	Suppl-g Clarity guidelines/proc				.25	5.59 ***	
2.	<u>Step 2: Technical Competency 1 and 2</u>	.606	.469	192.05 ***			
	Suppl-f Salary				.05	1.73	
	Suppl-g Clarity guidelines/proc				.04	1.14	
	Suppl-h Indicating objectives				.42	8.86 ***	
	Suppl-i Indicating priorities				.37	7.92 ***	
3.	<u>Step 3: Technical Competency 1, 2 and 3</u>	.715	.109	207.82 ***			
	Suppl-f Salary				.01	.43	
	Suppl-g Clarity guidelines/proc				.05	1.69	
	Suppl-h Indicating objectives				.18	4.18 ***	
	Suppl-i Indicating priorities				.13	2.93 **	
	Suppl-j Delegating tasks				.29	6.78 ***	
	Suppl-k Acknowledging contrib				.32	8.93 ***	
4.	<u>Step 4: Technical Competency 1, 2, 3 and 4</u>	.726	.011	164.00 ***			
	Suppl-f Salary				.00	.02	
	Suppl-g Clarity guidelines/proc				.02	.64	
	Suppl-h Indicating objectives				.17	3.86 ***	
	Suppl-i Indicating priorities				.10	2.21 *	
	Suppl-j Delegating tasks				.27	6.46 ***	
	Suppl-k Acknowledging contrib				.30	8.38 ***	
	Suppl-l Performance feedback				.04	1.14	
	Suppl-m Defining pers strengths				.12	3.56 ***	

Notes:

- (1) Reference used
- (2) Abbreviated item: for a full overview of items refer to Appendix XLV
- (3) Data sample n = 505 with listwise deletion of missing values
- (4) Response variable: Suppl-a: Encouragement manager to perform  
Suppl-a is hierarchically regressed on variables Suppl-f to Suppl-m through Steps 1 to 4
- (5) R<sup>2</sup> = Multiple correlation coefficient ΔR<sup>2</sup> = Change statistic of R<sup>2</sup> F = F statistic of the regression analysis  
β = Standardized beta coefficient t = t statistic of the beta coefficient
- (6) \* Statistic significant at the 0.05 level.  
\*\* Statistic significant at the 0.01 level.  
\*\*\* Statistic significant at the 0.001 level.

Table 7.6.  
Results of Regression Analysis of the single variable CAPTURED\_CONDITIONS on Extrinsic Technical Competencies in a stepwise hierarchical procedure including successive Competencies

II. Extrinsic Technical Competencies

From the data, a Cronbach alpha was obtained for the Suppl-a, Suppl-f through Suppl-m variable set of .90, indicating a high reliability (Kline, 1999). A full description of these items is provided in Appendix XLV. An overview of descriptive statistics for these variables is provided in Appendix XLVI, with an overview of inter-item correlations in Appendix XLVII.

Table 7.6. contains an overview of the regression analysis performed, where the

single concept variable CAPTURED\_CONDITIONS was regressed hierarchically on four sets of variables operationalizing the four Extrinsic Technical Competencies, i.e. Suppl-f through Suppl-m.

In a preliminary analysis of the data, no indications of multi-collinearity were found with inter-item correlations  $< .90$  between explanatory variables (Appendix XLVII), with Tolerance and VIF values well within limits, as initially defined in Chapter 7.4.1.1.<sup>1</sup> The Durbin-Watson was at a standard 2.08. In Table 7.6., Step 1 refers to the first stage in the hierarchy when only Extrinsic Technical Competency 1 was observed. The  $R^2$  at this stage was a modest .137. When Extrinsic Competency 2 was included in stage 2, the statistic increased considerably with .469 to .606, accounting for more than 60% of total variance. The inclusion of this second Competency, explaining a large amount of the variation in the dependent variable, remained prominent throughout stages 3 and 4. Stage 3 increased  $\Delta R^2$  by more than 10%, with stage 4 providing a slight increment towards a final  $R^2 = .726$ , with  $p < .001$ , thus meeting criteria initially set in Chapter 7.4.1.2. The Multiple correlation coefficient provided an excellent estimate of the proportion of variance in the single concept variable, explained by the linear regression. The analysis of variance testing the predictive or explanatory abilities of the model as compared to a mean value, were significant at every stage of each respective model ( $p < .001$ ). However, the modest contribution of Competencies 1 and 4 found earlier, was reaffirmed in the F-ratio's of each successive model, slightly decreasing from 207.82 to 164.00 in the final model. Nonetheless, all models significantly improved the ability to predict or explain the outcome variable.

These findings were confirmed in the observations of the model parameters, where variables Suppl-f and Suppl-g operationalizing Extrinsic Technical Competency 1, only provided a significant contribution as parameters in the first model. The contribution of variables Suppl-h and Suppl-i operationalizing Competency 2, Suppl-j and Suppl-k operationalizing Competency 3, and Suppl-m operationalizing Competency 3 were all significant to the model, providing support for the assumption that these three Extrinsic Technical Competencies are all relevant explanatory entities to the outcome variable.

Based on Green's indications elaborated on earlier in Chapter 7.4.2, these findings suggested to perform a further observation on a reduced sample size (Green, 1991). Referring to Appendix XLIX the significant fit of the model to the overall data, and the relatively large contributions of Suppl-h, Suppl-j, and Suppl-k could be confirmed, whereas other findings were not or only partially supported within these reduced data-sets, necessitating further research into these venues<sup>2</sup>.

<sup>1</sup> For the Extrinsic Technical Competency explanatory variables in Step 4 of the hierarchical regression, VIF values ranged from 3.47 to 1.23, the Tolerance statistic from .82 to .29.

<sup>2</sup> An overview of inter-item correlations per location is provided Appendix XLVIII.

Variables		Regression Analysis (3) (4)			
Ref.	Item	R <sup>2</sup>	F	β	t
(1)	(2)		(6)		(6)
<b>Attitudinal &amp; Technical Competencies</b>		.736	136.81 ***		
Suppl-f	Salary			-.01	-.37
Suppl-g	Clarity guidelines/proc			.02	.69
Suppl-h	Indicating objectives			.13	3.02 **
Suppl-i	Indicating priorities			.10	2.34 *
Suppl-j	Delegating tasks			.26	6.17 ***
Suppl-k	Acknowledging contrib			.20	4.60 ***
Suppl-l	Performance feedback			.02	.67
Suppl-m	Defining pers strengths			.10	3.12 **
Suppl-n	Appreciation contribution			.13	2.99 **
Suppl-o	Appreciation			.07	1.74

Notes:

- (1) Reference used
- (2) Abbreviated item; for a full overview of items refer to Appendix XL and XLV
- (3) Data sample n = 501 with listwise deletion of missing values
- (4) Response variable: Suppl-a: Encouragement manager to perform  
Suppl-a is regressed on variables Suppl-f to Suppl-o
- (5) R<sup>2</sup> = Multiple correlation coefficient    F = F statistic of the regression analysis  
β = Standardized beta coefficient    t = t statistic of the beta coefficient
- (6) \* Statistic significant at the 0.05 level.  
\*\* Statistic significant at the 0.01 level.  
\*\*\* Statistic significant at the 0.001 level.

Table 7.7.  
Results of Regression Analysis of the single variable CAPTURED\_CONDITIONS on both Extrinsic Attitudinal and Extrinsic Technical Competencies

To summarize, not all parameters contributed in a same amount to the final outcomes, but they all did contribute significantly at predicting the outcome, where the model provided a significant fit of the data overall, with R<sup>2</sup>=.726, p<.001. As such, hypothesis H1B, defined Chapter 7.4.3., appeared to be supported with the observation that in separate contributions of the Extrinsic Technical Competencies, Competencies 2, 3 and 4 were each found to provide a significant contribution to predicting, or explaining the outcome, whereas such evidence was gradually less prominent in the hierarchical regression for Extrinsic Technical Competency 1.

### III. Extrinsic Attitudinal and Technical Competencies

Conclusions summarizing findings for the Attitudinal Competency were confirmed in a combined analysis of both Attitudinal and Technical Extrinsic Competencies. Table 7.7 provides an overview of the regression analysis, where the single concept variable CAPTURED\_CONDITIONS was regressed on a combined set of variables representing the single Extrinsic Attitudinal Competency and the four Extrinsic Technical Competencies. Although the correlation coefficient increased only from .726 to .736, accounting for 1% of total variance, a contribution of the Attitude parameter represented by variable Suppl-n remained significant. However, given

these figures, and the ones obtained earlier in Table 7.5., it was assumed the Attitudinal component appeared to have had a considerable overlap in the total proportion of variance accounted for.

#### *IV. Intrinsic Attitudinal Competencies*

A hierarchical regression analysis was made to analyze effects of the Intrinsic Attitudinal Competencies, Respect, Dignity and Trust. A full description of the items used, is provided in Appendix L, with an overview of prominent descriptive statistics in Appendix LI and inter-item correlations in Appendix LII. In analyzing these items a Cronbach alpha was obtained of .94, indicating a high reliability of the data-set (Kline, 1999).

Results of this fourth regression analysis are presented in Table 7.8., where the single concept variable was regressed hierarchically on the three sets of variables operationalizing the three Intrinsic Attitudinal Competencies.

With these Attitudes conceptually in close proximity of each other, some cause for concern of multi-collinearity was given following the analysis of inter-item correlations with data approaching the .9 criterion set earlier in Chapter 7.4.1.1. However, with Tolerance and VIF values well within limits initially defined in Chapter 7.4.1.1.<sup>1</sup>, the data appeared to be acceptable for further analysis. The Durbin-Watson was at a standard 2.01. In Table 7.8., Step 1 refers to the first stage in the hierarchy when only Intrinsic Attitudinal Competency 1 was observed. The single parameter in itself accounted with  $R^2=.518$  for more than 50% of total variance. Although a subsequent introduction of Attitudinal Competencies 2 and especially 3, did not alter these values considerably, the explanatory abilities of the model as compared to a mean value, remained significant at each stage ( $p<.001$ ). As such, all models significantly improved the ability to predict or explain the outcome variable.

The prominent effects of Attitudinal Competency 1, appeared to be reduced in subsequent stages, suggesting an overlap in variance accounted for. High values in inter-item correlations found earlier, indicated a same effect. The inclusion of variables Suppl-n and Suppl-o, in line with earlier findings in the Extrinsic Modality, remained prominent in Step 3, where the single parameter operationalizing Attitudinal Competency 3 provided no further significant contributions to the model.

<sup>1</sup> For the Intrinsic Attitudinal Competency explanatory variables in Step 4 of the hierarchical regression, VIF values ranged from 5.55 to 2.70, the Tolerance statistic from .37 to .18.

Variables		Regression Analysis (3) (4)				
Ref.	Item	R <sup>2</sup>	ΔR <sup>2</sup>	F	β	t
(1)	(2)			(6)		(6)
1.	<u>Step 1: Attitudinal Competency 1</u>	.518		564.26 ***		
	Suppl-w Respect				.72	23.75 ***
2.	<u>Step 2: Attitudinal Competency 1 and 2</u>	.590	.072	251.35 ***		
	Suppl-w Respect				.19	3.13 **
	Suppl-n Appreciation contribution				.42	7.04 ***
	Suppl-o Appreciation				.21	4.52 ***
3.	<u>Step 3: Attitudinal Competency 1, 2 and 3</u>	.592	.002	189.75 ***		
	Suppl-w Respect				.16	2.37 *
	Suppl-n Appreciation contribution				.39	6.05 ***
	Suppl-o Appreciation				.19	4.22 ***
	Suppl-x Trust				.09	1.62

Notes:

(1) Reference used

(2) Abbreviated item; for a full overview of items refer to Appendix L

(3) Data sample n = 527 with listwise deletion of missing values

(4) Response variable: Suppl-a: Encouragement manager to perform

Suppl-a is hierarchically regressed on variables Suppl-w, Suppl-n, Suppl-o and Suppl-x through Steps 1 to 3

(5) R<sup>2</sup> = Multiple correlation coefficient ΔR<sup>2</sup> = Change statistic of R<sup>2</sup> F = F statistic of the regression analysis

β = Standardized beta coefficient t = t statistic of the beta coefficient

(6) \* Statistic significant at the 0.05 level.

\*\* Statistic significant at the 0.01 level.

\*\*\* Statistic significant at the 0.001 level.

Table 7.8.  
Results of Regression Analysis of the single variable CAPTURED\_CONDITIONS on Intrinsic Attitudinal Competencies in a stepwise hierarchical procedure including successive Competencies

High Multiple correlation coefficient values suggested a further analysis on reduced data-sets, following observations from Green mentioned earlier (Green, 1991). The significant fit of the model in the data overall was re-affirmed in the smaller data-sets yielding comparable R<sup>2</sup> values at two locations, and even higher at Location 03, with reference to Appendix LIV<sup>1</sup>, whereas the contribution of separate parameters, although significant, diverged from general findings.

In summary, all these Intrinsic Attitudinal Competencies did generate a significant contribution in explaining the outcome variable operationalizing the targeted Conditions enabling Motivation. Hypothesis H2A, as defined in Chapter 7.4.3., was therefore confirmed. However, in a hierarchic analysis, with Respect and Dignity already prominent in their respective effects, no substantial additional contribution for Trust could be observed. However, It is stressed at this point that these data do not indicate that the Intrinsic Attitude of Trust is less important, as the Multiple correlation coefficient of these combined Competencies is significant at predicting,

<sup>1</sup> An overview of inter-item correlations per location is provided Appendix LIII.



*or explaining the outcome in relation to a mean value, but rather that the Attitude of Trust fails to add a significant contribution to the effects already obtained by the prominent Attitudinal Competencies of Respect and Dignity.*

#### *V. Intrinsic Technical Competencies*

The four Technical Competencies used in the Intrinsic Modality, comprised of variables Suppl-p through Suppl-v, an overview of which is provided in Appendix LV, with a summary of descriptive statistics in Appendix LVI and inter-item correlations in Appendix LVII. A Cronbach alpha was obtained on these variables of .92, indicating a high reliability (Kline, 1999).

In the regression the single concept variable CAPTURED\_CONDITIONS was regressed hierarchically on four sets of variables operationalizing the four Intrinsic Technical Competencies. Findings are summarized in Table 7.9.

A first overview provided no signs of multi-collinearity, with correlations exceeding .9 between explanatory variables (Appendix LVII). Tolerance and VIF values were within critical limits defined in Chapter 7.4.1.1.<sup>1</sup> The assumption that errors in the regression are independent was likely met with a Durbin-Watson of 1.99. In Table 7.9., Step 1 refers to the first stage in the hierarchical regression when only the Intrinsic Technical Competency 1 was included in the analysis. Contrary to the findings for the Extrinsic Modality, this first Technical Competency in the Intrinsic Modality seemed to present the most prominent contribution, in accounting for more than 60% of total variance. In subsequent stages, the  $\Delta R^2$  statistic increased only marginally from .021, .023 to .003. All Steps in the analysis, however, were indicative of a significant fit of the data overall, with  $p < .001$ .

The gradual inclusion of parameters associated to the four Technical Competencies, resulted in a successively significant contribution of the distinct explanatory variables, with at least one variable operationalizing each Competency providing a significant contribution to predicting, or explaining, the outcome variable.

A further analysis was performed on reduced data-sets, following Green's observations mentioned in Chapter 7.4.2. The three distinct locations in the data-set were used to this aim. Referring to Appendix LIX<sup>2</sup>, a significant fit was observed in all overall data. For the distinct explanatory variables, these findings were reconfirmed in the larger data-sets at Locations 01 and 02, with the exception of Technical Competency 4, whereas at Location 03 with a smaller sample size, these findings diverged from the original observations.

<sup>1</sup> For the Intrinsic Technical Competency explanatory variables in Step 4 of the hierarchical regression, VIF values ranged from 4.06 to 1.23, the Tolerance statistic from .81 to .25.

<sup>2</sup> An overview of the inter-item correlations is provided Appendix LVIII.

Variables		Regression Analysis (3) (4)				
Ref.	Item	R <sup>2</sup>	ΔR <sup>2</sup>	F	β	t
(1)	(2)			(6)		(6)
1.	<u>Step 1: Technical Competency 1</u>	.606		268.50 ***		
	Suppl-p Listening				.26	5.79 ***
	Suppl-q Expressing interest				.19	4.24 ***
	Suppl-r Understanding				.40	8.53 ***
2.	<u>Step 2: Technical Competency 1 and 2</u>	.626	.021	219.30 ***		
	Suppl-p Listening				.23	5.34 ***
	Suppl-q Expressing interest				.15	3.36 ***
	Suppl-r Understanding				.31	6.47 ***
	Suppl-s Encouraging reflection				.20	5.37 ***
3.	<u>Step 3: Technical Competency 1, 2 and 3</u>	.650	.023	161.23 ***		
	Suppl-p Listening				.08	1.62
	Suppl-q Expressing interest				.14	3.06 **
	Suppl-r Understanding				.28	5.35 ***
	Suppl-s Encouraging reflection				.18	4.93 ***
	Suppl-t Receptive for suggestions				.27	5.91 ***
	Suppl-u Supportive when needed				-.02	-.48
4.	<u>Step 4: Technical Competency 1, 2, 3 and 4</u>	.653	.003	139.83 ***		
	Suppl-p Listening				.08	1.52
	Suppl-q Expressing interest				.13	2.95 **
	Suppl-r Understanding				.28	5.30 ***
	Suppl-s Encouraging reflection				.17	4.69 ***
	Suppl-t Receptive for suggestions				.26	5.69 ***
	Suppl-u Supportive when needed				-.02	-.47
	Suppl-v Adhering to agreements				.06	2.16 *

Notes:

- (1) Reference used
- (2) Abbreviated item; for a full overview of items refer to Appendix LV
- (3) Data sample n = 528 with listwise deletion of missing values
- (4) Response variable: Suppl-s: Encouragement manager to perform
- Suppl-s is hierarchically regressed on variables Suppl-p to Suppl-v through Steps 1 to 4
- (5) R<sup>2</sup> = Multiple correlation coefficient ΔR<sup>2</sup> = Change statistic of R<sup>2</sup> F = F statistic of the regression analysis  
β = Standardized beta coefficient t = t statistic of the beta coefficient
- (6) \* Statistic significant at the 0.05 level.  
\*\* Statistic significant at the 0.01 level.  
\*\*\* Statistic significant at the 0.001 level.

Table 7.9.  
Results of Regression Analysis of the single variable CAPTURED\_CONDITIONS on Intrinsic Technical Competencies in a stepwise hierarchical procedure including successive Competencies

Summarizing the findings for the Intrinsic Technical Competencies, it appeared that all parameters contributed significantly to explaining the outcome, where the model provided a significant fit of the data overall, with R<sup>2</sup>=.653, p<.001. Thus, hypothesis H2B was confirmed where all distinct Intrinsic Technical Competencies where found to provide a significant contribution to predicting, or explaining the outcome, and more than 2/3 of distinct explanatory variables produced significant differences from zero, as defined in criteria set in Chapter 7.4.3.

Variables		Regression Analysis (3) (4)			
Ref.	Item	R <sup>2</sup>	F	β	t
(1)	(2)		(6)		(6)
<b>Attitudinal &amp; Technical Competencies</b>		.682	99.25 ***		
Suppl-p	Listening			.04	.83
Suppl-q	Expressing interest			.09	1.85
Suppl-r	Understanding			.20	3.83 ***
Suppl-s	Encouraging reflection			.16	4.29 ***
Suppl-t	Receptive for suggestions			.19	4.11 ***
Suppl-u	Supportive when needed			-.03	-.79
Suppl-v	Adhering to agreements			.05	1.60
Suppl-w	Respect			.03	.41
Suppl-n	Appreciation contribution			.23	3.86 ***
Suppl-o	Appreciation			-.02	-.36
Suppl-x	Trust			.06	1.05

Notes:  
 (1) Reference used  
 (2) Abbreviated item; for a full overview of items refer to Appendix L and LV  
 (3) Data sample n = 522 with listwise deletion of missing values  
 (4) Response variable: Suppl-a: Encouragement manager to perform  
 Suppl-a is regressed on variables Suppl-p to Suppl-x  
 (5) R<sup>2</sup> = Multiple correlation coefficient    F = F statistic of the regression analysis  
 β = Standardized beta coefficient    t = t statistic of the beta coefficient  
 (6) \* Statistic significant at the 0.05 level.  
 \*\* Statistic significant at the 0.01 level.  
 \*\*\* Statistic significant at the 0.001 level.

Table 7.10.  
 Results of Regression Analysis of the single variable CAPTURED\_CONDITIONS  
 on both Intrinsic Attitudinal and Intrinsic Technical Competencies

VI. Intrinsic Attitudinal and Technical Competencies

A combined analysis was made of both Attitudinal and Technical Intrinsic Competencies. Table 7.10. provides an overview of the regression analysis, where the single concept variable CAPTURED\_CONDITIONS was regressed on a combined set of variables representing the three Intrinsic Attitudinal Competencies and the four Intrinsic Technical Competencies. As in the Extrinsic Modality, the effects of Suppl-n operationalizing Attitudinal Competency 2 remained significant, despite an only minor increase in the R<sup>2</sup> statistic from an original .653 to .682. As compared to Table 7.7, these findings show distinct similarities to the ones obtained for the Extrinsic Modality: significant contributions of the Technical Competencies, accentuated by the Attitudinal Competencies.

3. Discussion

All four hypotheses were found to be confirmed in the analysis of the data, following successive hierarchical regressions of the single concept variable, capturing the two targeted Conditions, on the respective explanatory variables

operationalizing the Attitudinal and Technical Competencies, for both Extrinsic and Intrinsic Modalities.

However, a number of restrictions are challenging these findings.

First and foremost, the sample generating these data was obtained from a single company at a Western-European location. Further replication of these data-sets, not only within different companies with distinct characteristics, but also at different locations worldwide, is needed.

The questionnaire containing the items used to capture variables Suppl-f to Suppl-x, poses restrictions, not only in its design, its handling and presentation, but also in its phrasing and operationalization of the concepts representing the twelve Competencies targeted. In addition, a mis-conceptualization of the single concept, assumed to capture Conditions of Perceived Support and Perceived (Mis)-Match in Mutual Perceptions, would leave results unreliable. These issues have been partly elaborated on in Chapter 7.5.1.3., but need to be mentioned as a possible threat affecting a correct analysis of the data.

Progressing on the high  $R^2$  values found, the data were obtained from larger samples that could have affected these values considerably. In this respect it is also noted that although the observed Competencies were represented significantly in the contributions made towards predicting or explaining the outcome variable, not all parameters used to indicate a single Competency provided a significant contribution.

#### *4. Conclusion*

*From the data, hypothesis H1A, as defined in Chapter 7.4.3., was confirmed suggesting that the single Extrinsic Attitudinal Competency appeared to be positively related to the single concept capturing the targeted Conditions Perceived Support and Perceived (Mis)-Match in Mutual Perceptions.*

*Extrinsic Technical Competencies provided a significant contribution to the model, thus confirming hypothesis H1B, defined Chapter 7.4.3. It was noted however, that three of the suggested Extrinsic Technical Competencies contributed significantly to these Conditions, with the exception, however, of the first Competency, where no significant data could be obtained on t-tests performed on separate Standardized  $\beta$ 's in these regression analyses<sup>1</sup>.*

<sup>1</sup> Summarizing from a slightly different perspective, it was found that amongst Extrinsic Technical Competencies, Competencies 2, 3 and 4 provided a significant contribution, with Competency 3, a Technique of Providing Active Assistance, being most prominent in its effects. One might state that an increase by one standard deviation for Suppl-j and Suppl-k operationalizing Extrinsic Technical Competency 3, i.e. an average .9 on a 5-point Likert scale according to Appendix XLVI, appeared to (Continued)

*Intrinsic Attitudinal Competencies were found to have similar effects, confirming hypothesis H2A, as defined in Chapter 7.4.3., where it was assumed that these Competencies would be positively related to the single concept capturing both targeted Conditions. However, on t-tests performed on separate Standardized  $\beta$ s, the third Attitudinal Competency failed to provide a significant contribution, possibly as a result of considerable overlap in concepts that were operationalized.*

*Finally, Hypothesis H2B defined Chapter 7.4.3. was confirmed, where it was assumed that Intrinsic Technical Competencies were contributing significantly in enabling the Conditions favorable to induce Intervention in the Process of Motivation. Similarly, however, not all parameters produced significant results on t-tests performed on separate Standardized  $\beta$ s<sup>1</sup>.*

### 7.5.3. Conclusions

*As a principal outcome, then, of the present Chapter, four Conditions were isolated that were assumed would enable an adequate Intervention in the Process of Motivation, two of which were thought could be targeted by specific Competencies.*

*In order to avoid co-variation and conceptual overlap, these two Conditions were represented by a single concept that was to capture the objective both Conditions were aiming at: their capability to lead to an Intervention which successfully interferes with the Process of Motivation.*

*An analysis in Study 10, of the single concept that was suggested, confirmed it to be an adequate representation of both Conditions. Moreover, a significant relation could be established between the concept and the Process of Motivation.*

*With the single concept variable adequately representing both targeted Conditions, defined as Perceived Support and Perceived (Mis)-Match, Study 11 revealed significant support for the two sets of Competencies suggested in both Extrinsic and Intrinsic Modalities, confirming associated Hypotheses H1A, H1B, and H2A, H2B, respectively.*

result in an increase of an average .29 standard deviation in the single concept variable Suppl-a, according to respective  $\beta$  values in Table 7.6. With a standard deviation of the outcome variable of .86, according to Appendix XLVI, this appeared to constitute a change induced by Competency 3 alone of  $.29 \times .86 = .25$  on a 5-point Likert scale, assuming all other parameters being constant.

<sup>1</sup> For an Intrinsic Modality, all Technical Competencies appeared to be significant, with a tendency for Technical Competency 1, a Technique of Clarifying Intrinsic Preconditions, to be most important. In a similar approach, an increase by one standard deviation for Suppl-r, being one of three parameters operationalizing Intrinsic Technical Competency 1, i.e. .88 on a 5-point Likert scale (Appendix LVI), appeared to result in an increase of .28 standard deviation in the single concept variable Suppl-a, according to its  $\beta$  value registered in Table 7.9. With a standard deviation of the outcome variable of .86 according to Appendix LVI, this appeared to result in a .24 change on a 5-point Likert scale, assuming all other parameters constant.

## 7.6. Summary

*Chapter 7 was to produce a descriptive empirical research providing evidence of a relation between concepts presumed to be indicative of Conditions and concepts operationalizing both Extrinsic and Intrinsic Competencies. Both Modalities were assumed to enable Conditions for a successful Intervention to occur, with two Conditions assumed to be essential: Support and a Match in Mutual Perceptions.*

*In two subsequent analyses these assumptions were verified.*

*The first study, Study 10, Chapter 7.5.1., aimed at a verification of an important side effect of the approach chosen. In defining concepts or variables capturing a specific Condition and variables operationalizing Competencies, it was expected a considerable co-variation would occur between both variables representing those entities. An alternative method was chosen where, instead of summarizing essential attributes of the two targeted Conditions in a number of distinct concepts, a single concept would be used. Instead of correlating distinct concepts, a single concept was to provide adequate evidence for a correlation between specific Competencies and the occurrence of a successful Intervention, thus avoiding excessive co-variation in expected results. Study 10 was designed to verify the assumed relation, both between the single concept and the two targeted Conditions, and between the single concept and the Process of Motivation. The assumptions formulated at length in Chapter 7.5.1.1., were found to be confirmed, with details provided in Chapter 7.5.1.2.*

*Thus, in Study 11, Chapter 7.5.2., a subsequent analysis could be made to provide evidence for a relation to exist between the single concept that was to represent the occurrence of a successful Intervention and specific concepts operationalizing Attitudinal and Technical Competencies, in both Extrinsic and Intrinsic Modalities. Multiple regression analysis was performed and from the data a confirmation could be obtained for two distinct sets of Competencies in addressing, or 'Management' of Motivation:*

- *For an optimal Extrinsic Modality in Management of Motivation:*
  - *A single Extrinsic Attitudinal Competency, defined as:*
    - *An Extrinsic Attitudinal Competency, 'Dignity'*
  - *Four Extrinsic Technical Competencies, defined as:*
    - *A Technical Competency of Providing Extrinsic Preconditions:*
    - *A Technical Competency of Clarifying Extrinsic Outcomes:*
    - *A Technical Competency of Providing Active Assistance:*
    - *A Technical Competency of Providing Active Feedback:*
- *For an optimal Intrinsic Modality in Management of Motivation:*
  - *Three Intrinsic Attitudinal Competencies, defined as:*
    - *An Intrinsic Attitudinal Competency, 'Respect':*
    - *An Intrinsic Attitudinal Competency, 'Dignity':*
    - *An Intrinsic Attitudinal Competency, 'Trust':*
  - *Four Intrinsic Technical Competencies, defined as:*
    - *A Technical Competency of Clarifying Intrinsic Preconditions:*

- *A Technical Competency of Clarifying Intrinsic Outcomes:*
- *A Technical Competency of Providing Passive Assistance:*
- *A Technical Competency of Providing Passive Feedback:*

Four prominent hypotheses were defined in Chapter 7.4.3., to verify the assumed relations between Conditions assumed to be targeted and the various Competencies defined to successfully address these Conditions:

- *In Extrinsic Management of Motivation,*
  - *Confirmation was obtained for hypothesis H1A, assuming that the Extrinsic Attitudinal Competency was significantly related to the single concept capturing targeted Conditions ( $R^2=.580$ ,  $F(2,527)=363.73$ ,  $p<.001$ ). Referring to Table 7.5. for an overview of Standardized  $\beta$  coefficients, and associated t-tests with respective significance-levels, the single Attitudinal Competency was used as predictor.*
  - *Confirmation was obtained for H1B, assuming that the Extrinsic Technical Competencies were significantly related to the single concept capturing the targeted Conditions ( $R^2=.726$ ,  $F(8,496)=164.00$ ,  $p<.001$ ). Referring to Table 7.6. for an overview of Standardized  $\beta$  coefficients, associated t-tests with respective significance-levels and successive change statistics produced in the hierarchical regression, the four Extrinsic Technical Competencies were used as predictors.*
- *In Intrinsic Management of Motivation,*
  - *Confirmation was obtained for hypothesis H2A, assuming that Intrinsic Attitudinal Competencies were significantly related to the concept capturing both targeted Conditions ( $R^2=.592$ ,  $F(4,522)=189.75$ ,  $p<.001$ ). Referring to Table 7.8. for an overview of Standardized  $\beta$  coefficients, associated t-tests with respective significance-levels and successive change statistics produced in the hierarchical regression, the three Intrinsic Attitudinal Competencies were used as predictors.*
  - *Confirmation was found for hypothesis H2B, with the assumption that Intrinsic Technical Competencies were significantly related to the single concept capturing both Conditions ( $R^2=.653$ ,  $F(7,520)=139.83$ ,  $p<.001$ ). Referring to Table 7.9. for an overview of Standardized  $\beta$  coefficients, associated t-tests with respective significance-levels and successive change statistics produced in the hierarchical regression, the four Intrinsic Technical Competencies were used as predictors.*

Following the Problem Statement defined in Chapter 2.5., then, the empirical research provided evidence for establishing a relation between concepts presumed to be indicative of Conditions enabling Motivation and concepts operationalizing these Competencies.

Providing evidence for these Competencies is the key finding of the third empirical research of this dissertation.

In addition, these findings provide secondary empirical evidence in support of the Model of Motivation, from which these Competencies were derived.