THE COMPELLED CIRCUMSTANTIAL TRUST IN PROJECT MANAGEMENT ENVIRONMENT:

VALIDATION OF THE SCALE MODEL

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KEYWORDS: PROJECT MANAGEMENT; CIRCUMSTANTIAL TRUST; STAKEHOLDERS

Abstract: This article investigates the phenomenon of compelled circumstantial trust, which project managers are subject to when performing their functions in the project environment. The objective is to contribute to the project manager's higher productivity and efficiency. Compelled circumstantial trust is a phenomenon that happens, for instance, when there is a change of any key stakeholder in the project environment, or when a new project manager takes over the project. Therefore, it is necessary to trust the administrative legacy inherited and those who are part of it, which may represent a potential problem for an efficient project management model and become a challenge for the project manager, and ultimately for the sponsor. This article discusses compelled circumstantial trust and presents a validated scale, together with a set of practices that aims to improve the performance of project managers in the exercise of their duties, while keeping the privileges and particularities of their role.

1. INTRODUCTION

This article investigates Compelled-Based Trust (Dias, 2016) from the perspective of the project manager's (PM) performance, and its impact on the project. It proposes a validated scale and a set of best practices with the objective of maximizing the level of productivity of PMs as they exercise their duties in management, according to the prerogatives of the role (Buvik & Tvedt, 2017).

The word for trust in Portuguese comes from the Latin confidere, which literally means "faith in common" (Dias, 2016). This is different from the English word Trust, which comes from the archaic German Trost, meaning "faith in the other" (Online Etymology Dictionary, 2016). It is defined as a positive expectation regarding the conduct of the other (Lewicki, McAl-lister & Bies, 1998) or a psychological vulnerability based on the expectation of reciprocity from the other. Trust implies at least two parties: the one that trusts and the other in whom trust is placed (Rousseau, Sitkin, Burt, & Camerer, 1998, p. 395). **Table 1** shows the theoretical approaches of trust.

Lewicki et al. (1998) defined Trust as the "confident, positive expectations regarding another's conduct" (p.439). Schoorman, Mayer & Davis (2007) revisit-ed the subject and pointed guidelines for future researchers:

"We also reviewed some of the interesting new directions in the research on trust. Prominent among these is the inclusion of the role of affect and emotion, trust violations, and repair. We believe these con-structs will add new dimensions to the model of trust and provide for valuable research in the future. Another area seeing rapid growth in interest is the role that international and cross-cultural dimensions play in the model of trust." (Schoor-man, Mayer & Davis, 2007, p. 352).

Trust is risk-taking, in every relationship). One person may trust the counter-part, but the counterpart may not trust her in return, after all, a relationship is not uni-directional. Trust involves a trustor, a trustee and a bet in the future (Schoorman et al., 2007).

To identify the types of trust and how they reveal themselves can help the project manager to promote e knowledge sharing among the stakeholders, since trust is a relevant factor of the psychological contract (Robinson, 1996), and psychological contract, in turn, affects project success (Shahnawaz & Goswami, 2011).

Knowledge is considered a key organizational resource (Nonaka & Takeuchi, 1995), and the effective sharing of knowledge is critical to an organization's success (Argote, Ingram, Levine, & Mo-reland, 2000; Mueller, 2014). Knowledge sharing is important in a project management environment, considering the nature of the temporary endeavor (Nesheim & Hunskaar, 2015), because this interaction provides information to project team members, and can lead to enhanced project performance (Liu, Keller, & Shih, 2011).

Trust and knowledge sharing are both social phenomenon that involves interpersonal relationships and social interactions (Chowdhury, 2005), and trust is one of the most significant elements that affect individual behaviors in organizations (Morgan & Hunt, 1994). Indeed, several authors recognize the effect of trust on knowledge sharing in teams (Andrews & Delahaye, 2000; Holste & Fields, 2010; McEvily, Perrone, & Zaheer, 2003).

Trust is also considered a critical factor for the development of effective teamwork (Webber, 2008), contributes to project success (Wong, Cheung, Yiu, & Pang, 2008), and is needed for knowledge sharing.

It is important, in the project management environment, that stakeholders share their diverse knowledge in order to establish a common understanding and effective collaboration (Zhang & Ng, 2012), and this attitude leads to a better project performance (Robinson, Carrillo, Anumba, & Al-Ghassani, 2005).

Table 1: Theoretical Approaches of Trust

Key Question	Behavioral	Psychological		
		Unidimensional	Two-dimensional	Transformational
How trust is defined and measured?	Derived from confidence. Measured by observable behavior in experiments	positive expectations; scales from distrust to high trust	trust = positive expectations distrust = negative expectations	expected costs and benefits; qualitative indicators
At what level does trust begin?	From zero or from cooperative behavior	from zero to initial trust	from low levels	begins at calculus-based stage
What causes trust (distrust) over time?	Increase if cooperative behavior (increase if competitive behavior)	greater number of positive (negative) interactions	number of positive (negative) interactions	grows with positive relationship (grows with disconfirmed expectations)

Source: Adapted from Lewicki, Tomlinson & Gillespie, 2006, 2006; Williamson, 1981; Mayer, Davis & Schooman, 1995; Rousseau, Sitkin, Burt & Camarer, 1998; Deutsch, 1958, Lewicki & Bunker, 1995, 1996, Shapiro, Sheppard & Cheraskin, 1992.

Trust is essential to all aspects of human interaction (Gad & Shane, 2014), and affects the relationship among stakeholders in the project management environment. Within a project management environment, there are particular features that can affect it, and trust is one of them. Despite many articles written on this topic, there are no clear applications in the project management setting, which describe the types of trust and situations that may occur. The Compelled-Based Trust (Dias, 2016) is a theoretical model that seems to fit in the project manager's daily relations.

In project management, negotiation skills are a core competence of the project manager. Most of the time, the project environment does not present the appropriate conditions to build the necessary relationships to develop trust. As project management is a set of different interests that must converge in order to create a deliverable result that creates benefits, negotiation is a constant issue between project stakeholders (Strahorn, Brewer & Gajendran, 2017).

The relationship between the project manager, the project team and the sponsor requires the project manager to develop what Rousseau states as "psychological contracts", which are "the beliefs of individuals concerning the reciprocal obligations between them and their organizations" (Rousseau, 1990, p. 390).

Such a framework of concepts and ex-planations has been developed and reported elsewhere (Strahorn et al., 2017), and underpins this investigation. The nature of trust and trusting relationships remain constant, regardless of the context – or procurement mechanism – in which they occur. It follows that trusting intentions – or their absence – are not shaped by the context.

Trust is an interpersonal phenomenon that manifests itself as some sort of power imbalance (Lewicki et al., 2006; Lewicki & Brinsfield, 2012). Much has been studied and discussed in relation to the influence of alternative procurement instruments used for project management, and the likelihood of a trusting relationship between client and contractor (Gad & Shane, 2014; Guo, Lu, & Song, 2013; Laan, Noorderhaven, Voordijk, & Dewulf, 2011).

Psychological contract theory extends the idea that individual goals create the resistance or acceptance of workplace changes and highlights the importance of an individual's beliefs regarding mutual obligations to the organization (Rousseau, 1990, 1995). When psychological contract obligations are met, high levels of trust and loyalty between employees and employers are created, which in turn can lead to higher customer satisfaction (Restubog et al., 2010; Wilkens & Nermerich, 2011).

In particular, there has been an emphasis on relational contracting (Doloi, 2009; Rahman & Kumaraswamy, 2008; Rahman, Kumaraswamy & Ling, 2007) and project alliances (Chow, Cheung, & Chan, 2012; Davis & Love, 2011; Walker & Lloyd-Walker, 2016) as vehicles for the formation of increased levels of trust across project teams.

As trust influences psychological con-tracts (Shahnawaz & Goswami, 2011), studying the context of trust expression (Dias, 2016) can be a contribution for project managers to understand how to engage and prepare themselves to develop competences for their duties (Lopes et al., 2016).

The objective of this paper is to validate the scale model for compelled circumstantial trust (Dias, 2016, 2018). This situation is common in the project environment and needs a better understanding in order to help the project manager change the focus of the psychological contract, from the relationship between the individual and the organization, towards the relationship between the individual and the project, with an emphasis on the project manager.

Trust is intimately tied to honesty, in negotiations involving the environment of project management, as well as in private enterprises (Lewicki & Hanke, 2012):

Trust and honesty are thus at the central core of negotiation. Each negotiator must decide how honest to be and how much to trust the other in the process of shaping and disclosing information to achieve a viable, acceptable agreement. In general, we can view honesty as the 'sender's responsibility' in the information exchange, and trust as the 'receiver's responsibility', but each person's actions and reactions are intimately tied to the other (Lewicki & Hanke, 2012, p. 214).

Trust has been studied from different angles: (a) trust between negotiators (Dias, 2020, 2018, 2016; Dias & Lopes, 2020; Lewicki & Polin, 2013; Olekalns & Adair, 2013); (b) trust as a process (Khodyakov, 2007; Barber, 1983); (c) Institutional trust (Khodyakov, 2007); (d) trust between groups (Serva, Fuller, & Mayer, 2005); (e) trust between institutions and the market (Fukuyama, 1995); (f) trust between nations (Labonne & Chase, 2010); (g) trust as a game (Evans & Krueger, 2014; Weber, Malhotra, & Murnigham, 2004); (h) trust and risk (Evans & Krueger, 2011); (i) trust associated with honesty (Lewicki & Hanke, 2012); among others.

The study of trust between officials or negotiators has been grouped into three large lines of research and their respective models: (a) the one-dimensional model, in which trust and distrust are the same con-struct, meaning that distrust is the absence of trust (Mayer et al., 1995); (b) the two-dimensional model, in which trust and distrust are two different constructs, meaning that distrust is not the pure and simple absence of trust, but an independent variable (Lewicki & Stevenson, 1998). Finally, (c) the transformational or evolutionary model, in which trust changes over time (Lewicki & Bunker, 1995, 1996; Shapiro et al., 1992). Trust involves reciprocity and the exchange of information related to interests (Gunia, Barnes & Sah, 2014).

Previous studies point to the evolution of trust in five stages: (a) trust-based on fear of retaliation (Lewicki & Polin, 2013); (b) trust based on a calculation of positive risk (Lewicki & Bunker, 1995); (c) trust based on knowledge due to previous multiple interactions

(Lewicki & Polin, 2013; Shapiro et al., 1992; Lewicki & Bunker, 1995, 1996); (d) trust-based on identification, which means that after several successful interactions, one side is able to rep-resent the other under any circumstances (Lewicki & Stevenson, 1998, p. 107; Lewicki & Polin, 2013); and (e) trust-based on circumstances or Compelled-Based Trust (Dias, 2016). In this case, special circumstances promote trust between the parties, even if they had not known each other previously, considering that from (a) to (d) the assumption is that one person has prior information about the other's behavior. This last form of transformational trust (Dias, 2016) is particularly sensitive to the project management environment.

There are cases where the project manager is forced by circumstances to trust a counterpart of whom he has no information. This party keeps a contractual relationship with the Project, which may be an agreement, for example. In this case, the vulnerability of the project manager will be tested, and the future relationship between the parties may be put in jeopardy, bring-ing short and long-term losses to the project (Dias, 2016).
Considering this, the object of this paper is to demonstrate the potential existence of a scale for Compelled-Based Trust. To do so, we used the scale validation protocols presented by Churchill (1979), Rossiter (2002), and DeVellis (2003) as a base, adapted to the need of the construct presented by Dias (2016).
The next section presents different scale validation protocols and the methodology used to select a scale. Data on the models and their respective results are described and discussed in sequence. Finally, we present the conclusions, recommendations for best practices and for future research.

2 METHODOLOGY: SCALE VALIDATION PROTOCOLS

This paper presents a 5-point Likert scale according to Rossiter (2002) and Churchill (1979). Samples were randomly selected among project managers of all industries, and we used the following soft-ware programs for data analysis: Cronbach's Alpha (σ) and exploratory factor analysis: SPSS, v. 16; Onyx for covariance matrix and factor forces; and AMOS 4.0 for confirmatory factor analysis and adjustment indexes.
Since the creation of the Likert scale (1932), it is the widest measurement scale accepted in academic studies; there-fore we employed it in this research. A scale preparation protocol consists of an organized set of stages that apply selected techniques to build a valid measurement scale (Rossiter, 2002; Kwon et al., 2013). For Churchill (1979), building a protocol is an activity that crosses several areas of science, even though it may not be recur-rent and avoid the use of specific methods. In this paper, we divided it into five stages, namely:

- (a) Definition of Construct. According to Churchill (1979) and DeVellis (2003), the construct should have a very
- (b) Scale: defined according to DeVellis (2003), by adopting the standards of the Likert scale, as suggested by Churchill (1979) and Rossiter (2002).
- (c) Items: for the preparation of the scale items, we adopted the procedures of Lucian and Dornelas (2014), who suggest that the development strategy begins by getting opinions from the target audience, because they are the basis for drafting the items that will make up the scale. Primary data gathering was made through questionnaires, followed by a study conducted with a focus group, together with an expert on the topic, in order to select, from all the opinions gathered, those useful to become part of the scale items and discard those considered irrelevant to the process of validating the scale (Lucian & Dornelas, 2014). The language we used, such as the vocabulary, textual style, and took into consideration the skills of the respondents and their level of understanding.
- (d) Scale Adjustment: in this stage, the invited expert checked whether the items were inconsistent with the formulated con-struct and with the measurement models, according to DeVellis (2003), that is, the validation of the scale. Next, according to Churchill (1979) and Rossiter (2002), we calculated Cronbach's Alpha (σ) in order to check the reliability of the proposed scale, which should be greater than 0.70 to validate the scale.

It is worth mentioning that for Sijtsma (2009), Cronbach's Alpha calculation for internal reliability is more a tradition than a technical choice, since it cannot measure internal consistency nor one-dimensionality.
Therefore, according to Hair, Black, Babin, Anderson, & Tatham (2009), we adopted composite reliability that indicates the degree to which a set of latent construct indicators is consistent with its measurements. It should be greater than 0.70 to be valid, according to Garver and Mentzer (1999) and Hair et al. (2009). Composite reliability (is described by the following equation:

$$: \frac{(\sum \gamma_i)^2}{(\sum \gamma_j)^2 + \sum E_j}$$

where: yj is the standardized load factor of the (assertive) indicator j and Ej is the measurement error of indicator j.
This study also followed the proposition of Hair et al. (2009), that the complementary criterion to composite reliability, the variance extracted, which reflects the total number of variances of the indicators, was explained by the latent variable. The formula of the Variance Extracted adopted in this paper is as follows:

$$\frac{(\sum \gamma_i)^2}{(\sum \gamma_i^2) + \sum E_j}$$

where: yj is the standardized load factor of the (assertive) indicator j, and Ej is the measurement error of indicator j. Notice that the difference between the composite reliability of the construct and the measurement of the variance extracted and analyzed here showed that, in the latter the standard loads are squared before they are added up. The recommendations of Garver and Mentzer (1999) and of Hair et al. (2009) were followed, and the values of the construct were equal to or above 0.5 (50%).
(e) Validation: the validation process used was the Confirmatory Factor Analysis (Churchill, 1979; DeVellis, 2003). We adopted Churchill (1979) for the terms of validation and reliability. The condition for a Construct to be allowable by science is that at least some of its correlates are ob-servable (Churchill, 1979; Kwon et al., 2013). The construct in question was measured in two or more ways, which means that we used the process of convergent validation and sought a high correlation between the instruments that measure the same Construct. On the other hand, Churchill (1979) suggests using the confirmatory factor analysis (CFA) to validate constructs and scales, as shown in **Table 2**:
The next section presents the study for validating the Compelled-Based Trust scale described by Dias (2016).

2.1 ANALYSIS OF THE VALIDATED SCALE FOR COMPELLED-BASED TRUST

The Compelled-Based Trust is defined as "a Transformative or Evolutionary Trust, in which trustors, with no previous information on their counterparts' reputation, are compelled to trust by greater circumstantial forces, in unknown trustees." (Dias, 2016, p.154)
The structure mentioned in the classical theory on validation protocols in five stages was followed (Churchill, 1979), as described in the previous section. However, to better identify the construct, we carried out an exploratory factor analysis during the items' creating stage, in order to classify more clearly the items brought by the experts in our construct.
Quantitative surveys were carried out to perform stages 1, 2, and 3 described below. Initially, surveys were done with N = 235 respondents, to prepare the items of the structured questionnaire, and then, for stages 4 and 5, a survey was done with N = 217 respondents, who were project management professionals and graduate students of management. We sent invitations by e-mail, and got a response rate of 75%. The survey was conducted electronically, using a website of electronic questionnaires. The following stages guided the scale development:

2.1.1 Stage 1: Definition of the Construct

In order to define the construct of Compelled-Based Trust, hereafter called COBT, we carried out literature research based on the theory described by Dias (2016), and found this trust model distinct from other trust models previously described in the literature.
COBT is the trust generated between parties without prior knowledge, and due to external circumstances, the individuals involved must trust each other so that negotiations can be closed satisfactorily.

2.1.2 Stage 2: Scale – answers

We used a 5-point Likert scale, where the statements ranged from 'Strongly Disagree' to 'Strongly Agree'.

2.1.3 Stage 3: Items

To build the items, the invited experts drew up a total of 29 statements, which were divided into five statements for trust based on fear of retaliation (Lewicki & Polin, 2013); five statements for trust based on a calculation of positive risk (Lewicki & Bunker, 1995); five statements for trust based on previous interactions (Lewicki & Polin, 2013; Shapiro et al., 1992; Lewicki & Bunker, 1995; 1996); five statements for trust based on identification, which means that after several successful interactions, one side is able to represent the other under any circumstances (Lewicki & Stevenson, 1998, p. 107; Lewicki & Polin, 2013); and nine statements for trust based on the circumstances or Compelled-Based Trust (Dias, 2016).
At this stage, we conducted an exploratory factor analysis to check the existence of the factors anticipated in each of the statements. For this first analysis, we got 230 valid respondents and a KMO = 0.718, which shows a good adaptation of the sample to the survey, with a level of 99% of statistical significance.
In the first analysis, we identified six components that were suitable for the research proposal. Then, according to the experts, the statements that corresponded exclusively to COBT were segmented, and the following ones were defined:

Table 2: Comparison of the proposed protocols.

Step	Churchill (1979)	Rossiter (2002)	DeVellis (2003)
Construct definition	Not considered	Guides	Subjective
Scale	Likert	Likert	Researcher
Items (affirmatives)	Not considered	Combinations	Subjective
Scale Adjust	Cronbach's Alpha	Cronbach's Alpha	Cronbach's Alpha and Scale Validation
Validation Process	Confirmatory Factor Analysis	Predictive	Confirmatory Factor Analysis

Source: Adapted from Lucian & Dornelas (2014).

- COBT1- There are cases in which, even without knowing the other party, you need to trust it.
- COBT2- Trust can arise in unexpected circumstances, even with strangers.
- COBT3- If the circumstances so require, I can trust a complete stranger.
- COBT4- A stranger can be trusted in extreme cases.
- COBT5- Strangers can be trusted if the case involves the risk of death.
- COBT6- I could trust a stranger if the subject were very important to me.
- COBT7- I could trust a stranger if the subject were extremely important to me.
- COBT8- If the subject were vital to me, I could trust a stranger.
- COBT9- In a situation of unexpected circumstances, I could trust a stranger.

2.1.4 Stage 4: Scale Adjustment

For the stages of adjustments and validations, N = 217 respondents were surveyed. As described in the literature, Cronbach's Alpha was initially used to validate the scale, which requires a value higher than 0.70, and we also used the metrics of composite reliability and mean-variance, which must present results above 0.70 and 0.50, respectively.

Thus, we reached the following results with the survey according to **Table 3**:

Cronbach's Alpha	Cronbach's Alpha standardized item basis	#Items
0,929	0,931	9

Table 3: Cronbach's Alpha (σ)

Furthermore, the results shown in **Table 4** were obtained for the items of composite reliability and mean-variance:

Latent Variable	Composed Reliability	Extracted Variance
CPBT	0,953	0,593
0,929	0,931	9

Table 4: Composite Reliability and Variance Extracted

The results were well above those expected for acceptance, in all adjustment tests that checked the reliability of the proposed scale.

2.1.5 Stage 5: Validation

To validate the scale, a confirmatory factor analysis (CFA) was done. The soft-ware chosen for this test was ONYX, in its version 1.0.3 (2014). To carry out the CFA tests, we considered the maximum likelihood estimation model. To do so, a hypothetical model was prepared, as shown in **Figure 1**:

Thus, for the model, the following covariance matrix was found, shown in **Table 5**:

Regression Weights	Estimated	Standard Error
COBT1□COBT	1	
COBT2□COBT	0.99	0.76
COBT3□COBT	0.82	0.55
COBT4□COBT	0.89	0.49
COBT5□COBT	1.01	0.3
COBT6□COBT	0.85	0.11
COBT7□COBT	0.88	0.14

Table 5: Factorial Matrix

Through the factorial matrix, we notice that the load factors are high, which point to a direct relationship with the assessed construct. Thus, **Table 6** presents the co-variance matrix resulting from the ONYX system:

CBPT	CBPT1	CBPT2	CBPT3	CBPT4	CBPT5	CBPT6	CBPT7	CBPT8	CBPT9
CBPT1	1.000	0.481	0.472	0.511	0.595	0.648	0.638	0.611	0.581
CBPT2		1.000	0.430	0.466	0.542	0.592	0.582	0.557	0.530
CBPT3			1.000	0.457	0.532	0.580	0.571	0.547	0.520
CBPT4				1.000	0.576	0.628	0.618	0.592	0.563
CBPT5					1.000	0.731	0.719	0.689	0.655
CBPT6						1.000	0.785	0.752	0.715
CBPT7							1.000	0.739	0.703
CBPT8								1.000	0.674
CBPT9									1.000

Table 6: Covariance Matrix

The following indexes were analyzed for adjusting the model: X2, CFI (Comparative Fit Index), RMSEA (Root Mean Square Error of Approximation), NFI (Normed Fit Index), and GFI (Goodness-of-fit index), which, according to the specialized literature, must present the follow-ing values: CFI over 0.90, RMSEA near or less than 0.08, GFI higher than 0.90, and NFI higher than 0.90. (Hair et al., 2009; Bentler, 1990; Byrne, 2001; Ullman, 2001). AMOS was used in its version 4.0 for these indexes, and the following results were found, as shown in **Table 7**:

Index	Model
X2	1530 (GL. 15)
GFI	0.915
CFI	0.921
NFI	0.913
RMSEA	0.081

Table 7: Indexes for Adjusting the Model

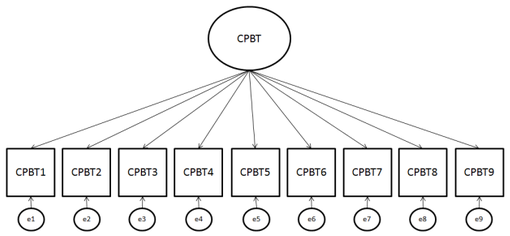

Figure 1: Hypothetical model of COBT

3 CONCLUSION

Understanding trust as a process and an evolutionary model involving reciprocity and exchange of information related to interests, the inclusion of the momentum zero of interaction between the parties in a project is needed. This research concludes that a compelled circumstantial trust scale can be used in the project management scenario, emerging as a result of good project-stakeholder relations.

The objective of this study was to suggest and evaluate the validity of a scale to measure the construct of Compelled-Based Trust (COBT) through the scale's validation protocols based on the models proposed by Churchill (1979), Rossiter (2002), and DeVellis (2003). We also conducted an exploratory factorial study to strengthen the building of the items, which can be applied to the project management environment, and concluded that the scale is valid and presents input regarding trust in a project management environment.

There are cases where the project manager is forced by circumstances to trust a counterpart of whom he has no information about.

This party keeps a contractual relationship with the project, which may be an agreement or a contract. In this case, the vulnerability of the project manager will be tested, and the future relationship between the parties may be placed in jeopardy, bringing short- and long-term losses to the project.

For this purpose, we conducted a quantitative survey using a structured questionnaire with a sample of N = 217 respondents. After data analysis, the reliability of the data collection instrument was checked, with appropriate results for Cronbach's Alpha (σ), Variance Extracted, and Composite Reliability.

Similarly, through the use of indexes that adjusted the model, we observed that it showed a high level of fitness to the parameters proposed by the theory. Thus, we concluded that the proposed construct is valid within the context.

For future research, we recommend testing the same construct in adaptation to different countries in order to confirm the application of the scale under different scenarios, and to prove the feasibility of the construct in other cultural systems.

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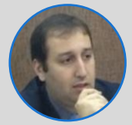

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...VALIDATION OF THE SCALE MODEL