ABCD Management Theory

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Abstract

This paper introduces a new and innovative management theory which can be used for developing and validating business models by using ABCD Validation Method. This is a newly developed validation method which mainly focuses on two principles. The first to understand the purpose of the model and identify and develop the approach of the validation. While the second to design validation through analyzing, building, checking and deciding. In this paper, a theory of validation quality management is proposed and articulated to describe and explain the effects of adopting quality management theories. This combines a quality management method with the approach used in ABCD Validation Method which is based on analytical by Structural Equation Modelling (SEM) using Analysis of Moment Structures (AMOS) for building and validating Business Excellence Models. The design of ABCD Validation Method is based on a new method of direct and/or indirect path evaluation which divides relationship paths into categories based on ABCD alphabetical coding, and provides a systematic, sequential and logical view based on the ABCD rule of thumb which enables the analysing process to take place with ease and accuracy prior to and during the validation process.

Keywords: *process improvement; innovative management;; structural equation modelling; model validation*

I. Introduction

In order to ensure the model is developed according to the company logic of value creation [1] or to confirm the method of doing business by which a company sustains itself [2], a validation process is required to ensure that a model is fit for use. Schereiber, et al. [3] listed several drawbacks in the validation process such as path analysis, for example, as path analysis requires unidirectional relations and an error-free single indicator which does not incorporate feedback loops among variables. Another drawback is that it does not permit the possibility of a degree of interrelationship among residuals associated with variables used in the Path Model. A number of breakdowns and limitations in conventional path analysis elevate the difficulty in interpreting a model's regression, such as collinearity, autocorrelation and unidirectional functions [4]. Path analysis is only applied with steady progressive causalities as all intervening variables are served as dependent

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variables, thus a model has to be tested by straightforward multiple regression. However, this limitation will not influence the Business Excellence Model to be researched.

ABCD management theory stated that ABCD can be thought of as "Achievement Because of Continuous Development". The achievement here is considered to be the best decision that can be obtained to validate a decision or Business Excellence Model. The ABCD management theory is based on continuously gaining sustainable achievement, similar to many other quality management methodologies, such as the Deming Cycle, 6 Sigma and Kaizen. In addition, it also matches with best instruments for assessment, such as RADAR logic, which is used in the European Foundation for Quality Management (EFQM) [5].

The ABCD Validation Method contains a prescriptive set of eight stages which serves as guidelines for suitable validation and best practice related to validation management. Despite the apparent effect of these eight stages, there is a total of 19 steps for validation distributed among the eight stages of the four phases of ABCD.

The objective of this article is to propose a theory of ABCD management underlying the ABCD management method to regulate methodologies of validation for Business Excellence Models, decision making, experiments and process models.

As will be discussed in this paper, the analysis leads to the conclusion that the theoretical principle of the ABCD management theory concerns the creation of a successful validation method which fosters analysis, learning and determination of achievement for facilitating the implementation of effective validation process management practices which, in turn, lead to continuous improvement of the processes involving management decisions and ultimately to organizational excellence.

In the following section the ABCD management theory is contrasted with the Deming cycle and RADAR logic. The results are then used as the basis for a new theory of ABCD Model of management and this introduces ABCD Validation Method, which is explained in the next section. Next, the main aspects of ABCD management theory and other management theories as found in the literature are presented the critical differences among them are clarified. The issue of justification is then raised: Why would anyone accept ABCD management theory rather than existing management methods? In subsequent sections, the underlying evidence and arguments justifying the theory from the perspectives of analysis, learning, and determination of achievement justifications are presented and evaluated. It can be concluded that the three approaches of ABCD management theory are mutually supportive and serve to critically underpin the theory in all its forms.

II. ABCD management theory

The ABCD theory is intended to both explain and guide the structure and implementation of the established validation process. Towards the end, decision making is viewed as a part of organizational excellence through learning and analysis, and determination of achievements.

The ABCD management theory is general and comprehensive and it is found to be suitable when integrated with quality management methods as an innovative solution. The ABCD theory involves the three aspects of analysis, learning and determination of achievement. Analysis is the most essential part in any process of quality management, which is defined as the procedure by which a discrete intellectual or substantial whole is organized into parts or components [6] and gets beyond simple description into examination and explanation which lead to finding new knowledge. The determination of achievement is knowledge obtained to satisfy management to perform effective decisions based on reliable factual information. Learning is a key factor for management to ensure continuous and sustainable development and improvement. The three main aspects of the ABCD management theory emphasize the importance of identifying the results of analyzing problems and determining achievements, while focusing on the learning curve. The Deming Cycle and RADAR logic are both popular quality management tools used in various industries and organizations [7] which are possible to use for continuous quality improvement of products, processes and services in organizations, with findings depending on purpose. Every organization will have to find a proper way forward and use a combination of methodologies in its implementation process. The Deming cycle is a well-known fundamental concept of continuous-improvement processes and project management. In modern post-industrial company, the strategic initiatives should be placed in a feedback loop, complete with measurements and planning linked in Deming cycle [8]. In continuous-improvement processes [9], the Deming cycle initiates plan steps which consist of identifying and analyzing a problem in terms of project management [10]. RADAR logic provides a structured approach assessing organizational performance in conjunction with the EFQM Excellence Model. It permits a standardized assessment of how well enablers of an organization achieve results. The effectiveness of the Deming Cycle tends to be more at the start of planning and during the execution of the work, whereas the RADAR Model tends to present more after the work is completed and can be used as an assessment tool for evaluation purposes.

Jaccard [11] stated that RADAR logic was inspired by the Deming Cycle. He suggested that an organization worked sequentially by defining “Results and Approaches” required to achieve its strategy. The criteria of the approaches were assessed in an integrated and sound approach, whereas in the Deming Cycle planning for results was expected at the present time and in considering a future “plan”. Figure 1 shows the concept of ABCD Validation Method, Deming Cycle and RADAR logic. ABCD defined the purpose and

approach in the first steps (ANALYSE) of the model which included planning and listing the analysis required to be used. RADAR systematically "deploys" these approaches to ensure implementation in full in order to "do" as the Deming Cycle demonstrated; ABCD required to (BUILD) the model that needed to be validated. During the RADAR stage "assess" to those elements which had been done, evaluated them by indicating (CHECK) with a set of tests stated in the Deming Cycle and ABCD. Lastly, RADAR emphasized to "refine" and correct them to "act" as in the Deming Cycle or to (DECIDE) the best from the evaluated options in ABCD.

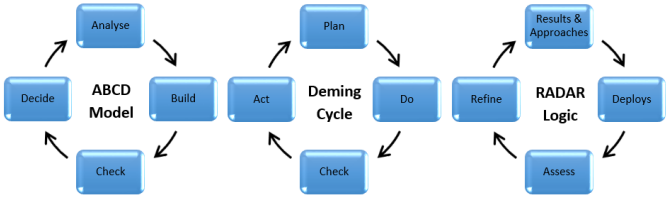


Figure 1: ABCD Model, Deming Cycle [8] and RADAR logic [5]

The RADAR logic aimed to identify strengths and weaknesses of an organization and initiated a phase of continuous improvement or ongoing process improvement. It can also be used as a method of problem solving throughout a company. Similarly to the Deming cycle, RADAR logic can be seen as the basic building block of a management system. ABCD management theory takes into consideration both mentioned methods. This includes the steps: Analyze the purpose and approach (Plan/Result and Approach), build the management model (do/deploy), check by carrying out tests (check/assess) and decide the best action (act/refine).

As RADAR logic is used as a mechanism to evaluate the "past", the Deming Cycle evaluates the "present", while ABCD combines those quality management tools and methodologies to become an integrated solution which covers advanced features and improves the area of management concerns.

III. The Fundamental Concept Of Abcd Model Analysis

ABCD Validation Method is developed from the fundamental concept that achievement is considered to be the best decision that can be obtained in order to validate a model. The process is a continuum of three different cycles and covers three main aspects of analysis, learning and determination of achievement, as shown in Figure 2.

The analysis aspect includes three stages: "analyze, build, check". These stages are formed by a series of processes to ensure that the right incoming information goes through standardized examination tests and meets the required criteria.

The determination of achievement aspect is represented by the stage "decide".

The learning aspect is represented by three cycles of the model, which is the theory model cycle, the measurement model cycle and the valid model cycle. Each cycle of the models needs to go through the ABCD process and learn new knowledge from each cycle to the next cycle, thus giving continuous and sustainable development.

ABCD Validation Method consists of four basic ABCD stages, which are positioned in the outer part of the model, and there are two sub-stages in each (see Figure 3). Therefore, there are eight sub-stages in total required to validate a Business Excellence Model. Figure 3 displays the steps which should be followed in order to validate a Business Excellence Model. The four main stages are as follows:

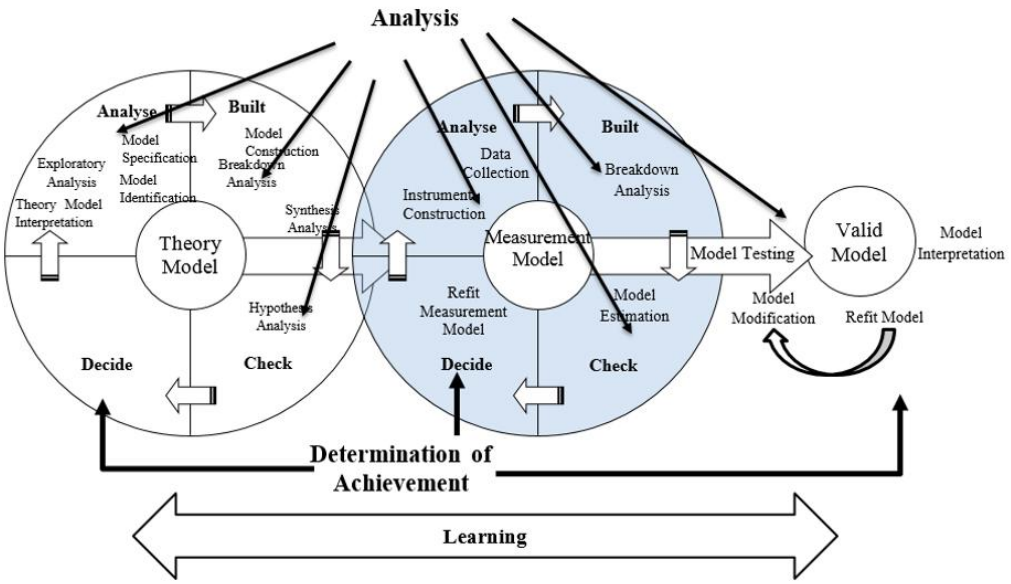
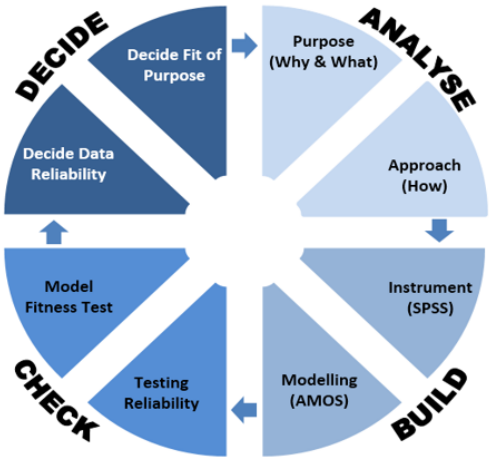


Figure 2: Foundation concept to validate model



	ABCD Validation Score	Step	Weight Score
Analyse (40%)	Purpose (What, Why, When) & Approach (How)	1	10%
	Exploratory Analysis	2	5%
	Degree of Well Enabled	3	5%
	Synthesis Analysis	4	5%
	ABCD Path Analysis	5	5%
	Hypothesis Analysis	6	5%
	Measurement Model Specification	7	5%
Build (15%)	Hypothesis Development to questionnaire	8	5%
	Instrument for data collection & processing (SPSS)	9	5%
	Modeling (AMOS)	10	5%
Check (25%)	Reliability Test	11	5%
	Measurement Model Identification (Degree of Freedom)	12	5%
	Breakdown (VIF & others)	13	5%
	Regression Estimation	14	5%
	Fitness Test	15	5%
Decide (20%)	Good Range of Model Fitness	16	5%
	Model Modification and Refitting	17	5%
	Interpretation of Valid Model	18	5%
	Fitness for Purpose	19	5%
Total ABCD Score 100%			

Figure 3: ABCD Validation Method

- Analyze the Business Excellence Model validation by identifying the purpose and approach to perform an analysis with minimum time and high accuracy. The approach has to include the selection criteria for validation, a selection of series of measurement, a selection of analysis, and planning of the validation process.
- Build the Business Excellence Model according to the purpose and approach.
- Check the fitness of the Business Excellence Model by a series of reliability tests and analysis to determine the validation of the measurement model and to determine fitness of purpose.
- Decide on the validity of the business model by final interpretation, determination of correlation values and regression.

The use of the ABCD Validation Method is to obtain successful validation results by following a systematic approach with steps which are simple to remember, implement and refine. Also, it overcomes some of the drawbacks and limitations mentioned by many researchers. The path analysis in the ABCD Validation Method allows direct estimation of a correlation between components with hypothesis analysis. It also allows multi-dimension correlation analysis in the regression calculation, which is the data set for dependent and independent variables (correlation) or for regression coefficient (prediction) elements during real case research analysis.

The ABCD Validation Method allows the option for direct study of the regression coefficient which avoids common breakdowns such as collinearity and autocorrelation. The conventional path analysis is “passively” dependent on the calculated parameter

causing common breakdown. The option is to "actively" control regression from the coefficient of determination (or "R" value) and "disturbance of regression" (or residual term or regression), which are the most important parameters for collinearity and autocorrelation. ABCD Validation Method avoids researchers or implementers falling into the "traps" of collinearity where every independent variable only consists of single correlation to dependent variables.

The ABCD Validation Method starts with defining the purpose of the validation and ends by deciding fitness of purpose. The validation is required to determine the criteria on which the measurement model is built and the analysis can be respectively divided into several categories. For example, in Business Excellence Models containing similar components like the European Foundation for Quality Management (EFQM), then a codification in alphabetical ABCD can be used to carry out bidirectional path analysis. The ABCD Validation Method also contains Structure Equation Modelling (SEM), which takes place over several steps; it starts with tuning the model. Standardization and modification operations are carried out to increase the fitness of the model to a good range of performance.

A. Analyses

The first stage of the validation process is to analyse the business model by identifying the purpose and the approach to perform an analysis with minimum time and high accuracy.

- Purpose- At first, the analysis will help to understand exactly the purpose to be determined. It could be that new models need strong validation, an existing model's validation needs to be evaluated, a decision making process needs to get the right result or an experiment needs strong support in validation
- Approach (How to validate?)- The approach may be varied from case to case. The general approach for research purposes is suggested to start from theory model construction until the model is validated. The following steps have to be followed while finalising the approach:

The criteria for the validation of a model need to be identified clearly at the first step. The quality of the selection criteria will result in the quality of validation. For example, to validate the Business Performance Management Model, the following criteria are selected:

Cost, speed, dependability, reliability, with the next step being to select a set of measurements. Measurement of the cost, time, availability and deliverables and number of failures are also needed. The last step is to analyze any applicable elements during and before building the model. The following are some of the recommended analysis steps which are usually required in the validation process of the Business Excellence Model.

- Exploratory Analysis- Exploratory analysis can be performed to expand further possible investigations which should be closely related to the researched topic.

Exploratory analysis aims to find research patterns which are not predicted by the researcher's current knowledge or pre-conceptions. A researcher can thus collect the studied data and construct it into a matrix table. An analysis can be established to ensure cause-effect relationships between components for further research

- Degree of well enabled- The degree of well enabled will indicate not only how to validate, but to determine the quality of the validation. Evaluation of relationships between criteria is summarized into three categories, which is low enabled, marginal enabled and well enabled. Well enabled means that relationships are well established. Marginal enabled indicates an average relationship, while low enabled represents a poor relationship between criteria
- Synthesis Analysis- The studied model is divided into a few separate individual groups for detailed research on particular characteristics
- Hypothesis Analysis- Hypothesis analysis is performed to confirm outcomes from exploratory analysis by making various assumptions. A series of tests will be established based on these assumptions and data from testing will be analyzed
- Model Specification- A model's parameters should be determined as either fixed or free. A free parameter is one to be estimated from observed variables and fixed parameters, which are known parameters used to assist free parameter estimation. A researcher must understand those parameters' characteristics and decide the pathway to be studied. This determines which parameters will be used to compare the hypothesized model with the sample population variance and covariance matrix in testing the fitness of the model. The later step of the specification is to insert the decided value to a particular parameter in the AMOS Model. This will decide the degree of freedom which will be discussed in the next section. Specifications could be re-proposed to meet model fitness during model modification.

B. Build

To validate a model, two models need to be built, theory and measurement models. The behaviour of the independence of individual groups will be considered in hypothesis analysis and also break and make stages are conducted as and when modification is necessary.

- Hypothesis Development into questionnaire- The observed data will be collected through survey questionnaire, which is developed from hypothesis analysis. The expectation to collect feedback from data providers should be estimated. Certain information may be sensitive to data providers or reactions from data providers may not be suitable to the study. An alternative channel for data collection should be ready and data filtering may be needed. There are a number of online questionnaires or survey service solutions which provide low cost, faster and more simply designed methodologies. Some of them also provide solutions to convert collected data to particular statistical analysis software formats, such as the SPSS format

- Instruments for data collection and processing (SPSS)- SPSS software can be utilised to process the collected survey data into a set of databases which will be used to check the reliability value of data and then integrate them into AMOS Modelling. The collected data from questionnaires must be in SPSS data format, otherwise format converting will be required. When collected information has been put into SPSS data sets, it is considered as "ready" for further analysis, such as Reliability Tests and AMOS
- Modelling AMOS- A measurement model can be constructed using one of the families of statistical procedures including techniques such as path analysis. One available software program for this purpose is Structural Equation Modelling (SEM); it allows an evaluation of hypotheses by testing theoretical models or what tests are supposed to measure and is consistent with observed covariance [12]. AMOS (Analysis of Moment Structures) is a sub-software program for SPSS. It is a graphical interface to specify models by illustrating them with drawings. AMOS implements a general approach to data analysis known as Structural Equation Modelling (SEM), also known as analysis of covariance structures, or casual modelling. Measurement models are differed from theory models where they contain observed variables. Observed variables are designed to accommodate the collected data during a survey questionnaire to define and infer connected latent variables. AMOS Modelling can estimate the various parameters such as regression weights between variables, covariance and variances of particular variables.

C. Check

This stage covers all the tests required to validate and verify model fitness. It has two parts; the first starts with reliability tests and model identification, and the second finalizes model fitness tests.

- Reliability test- the Alpha Cronbach Reliability Test is normally conducted to evaluate the reliability of a set of measurement data such as a questionnaire or survey. Nunnally [13] indicated that in reliability results there should be at least 0.7 to accept data for further estimation and calculation
- Check model identification (degree of freedom) - Before testing relationships between model components or variables, a model must be over-identified, that means the degree of freedom should be positive. That is, only an over-identified model should be able to be evaluated in modelling. If a model is found to be identified or under-identified, some necessary fixing action should be undertaken, such as adding variables to the model. The degree of freedom may be changed during model modification to improve fitness. Therefore, maintenance with "over-identified" status is required
- Breakdown Detection- Breakdown testing is required to detect existing common limitations in a model. Breakdowns including collinearity, misspecification and autocorrelation will be minimized in this step. Collinearity, or Multicollinearity, [14] [15] [16] [17] always exists between variables. This is defined as two or more

independent variables which correlate highly to each other, thus giving an inaccurate regression to the respective which depends on variables. A researcher may face difficulty in interpreting a model because of this inaccurate regression. The detection can be done by using a variance inflation factor (VIF) calculation [18] [19]. Corrective action such as removing redundant independent variables and aggregating similar independent variables will effectively solve the collinearity.

Autocorrelation occurs in time series analysis. The appearance of autocorrelation will cause the estimation of standard errors that are coefficient biased and larger, thus expected results from the studied model will not be achieved

- Regression Estimation- Regression estimation is performed to evaluate relationships between the studied variables. Relationships are commonly described as having a direct effect, an indirect effect or a total effect. These can be used in multi-dimensional ways in ABCD Validation Method. In conventional ways, it is only conducted by plotting datasets of dependent variables and independent variables to find the coefficient of an equation. Those variables represent causes and effects in quantifying values which can be obtained during data collection. Alternatively, causes and effects can be estimated or predicted if the regression coefficient is known. Therefore, directly collecting direct relationships between those variables was used for theory model construction in the case study in this paper. A series of path analysis equations were then formulated to calculate indirect and total effects of relationships between those variables. A number of popular statistical software programs were used to compute correlations such as AMOS.

This is the result determination step of correlation analysis, when regression and correlation between variables can be calculated. All values are meaningful to the model and results may be influenced by further breakdown. Therefore, breakdown analysis should be used to minimize this influence

- Model Fitness- The ability to test measurement models across multiple groups also provides a way to evaluate measurement invariance or construct bias, which means the test measures the same constructs with the same accuracy in different samples. Computer programs are essential tools for conducting analysis and other types of SEM.

AMOS is one of the most popular software programs (Analysis of Moment Structures) [12] [21]. The Structural Equation Model (SEM) emerged in the mid 1980s. There are common types of SEM such as path analysis [22], Confirmatory Factor Analysis (CFA) [3], Exploratory Factor Analysis (EFA) [23] and the Structural Regression Model. Path analysis,

which is also known as Causal Modelling, focuses on examining the network of relationships between observed variables.

D. Decide

The last stage of validation is when analysis has been completed, building the model has been successfully achieved and all necessary checks have been carried out to verify model fitness, while the last stage would be to decide fitness for purpose by devising a clear set of criteria. During the decision, it is understood that any changes and modifications can take place to bring the results up to satisfactory levels of validation.

- Decide Model Validation- It is important to verify and determine correlation values, regression and model fitness tests. This step mainly focuses on decision making processes for every test and the final decision of model validation
- Decide Model Fit Criteria- At least five fitness criteria should be met in the test, otherwise the model should be modified with theory justification. Popular fitness criteria include Ratio between X2 and degree of freedom, Adjunct Fit Indices (AFI), Goodness-Of-Fit (GFI), Root Mean Square Error of Approximation (RMSEA), Root Mean Square Residual (RMR), Adjusted Goodness-Of-Fit (AGFI), Bentler-Bonett Non-Normed Fit Index (NNFI) and Comparative Fit Index (CFI)
- Model Modification and Refitting- This is required when model fitness is not satisfied. Hypotheses or the model structure can be adjusted and the model can be retested. Mostly the solutions include those such as re-specifying fixed and free parameters, adding paths or covariance. Any modifications should meet with theory interpretation, otherwise modifications are not recommended. Every single parameter or path modification requires a single test until fitness is achieved. Trimming unwanted variables or insignificant variables or adding possible connections to variables may contribute to significant relationships
- Interpretation of valid model- This is the last step for modelling. All valid models should be interpreted. This must be carried out for both theory models and valid measurement models, as comparisons for both may be different due to realistic factors.

ABCD Validation Method is simple, direct, focused, accurate, logical, informative and practical. It also complies with best practice of most validation techniques and overcomes the drawbacks and limitations associated with current validation methods.

The ABCD Validation Method is not only a validation tool and not only shows how to validate but also indicates how good the validation is through the ABCD validation score.

IV. An Empirical Test and Validation of Dubai Government Excellence Program (DGEP)

The ABCD Management theory was applied in a validation that carried out on Dubai Government Excellence Program (DGEP) model 2009 version and has led to some alteration in the DGEP model and has been considered and implemented as part of the internal continuous process improvement in the latest version of DEGP 2014 [24].

The Questionnaire was distributed through internet survey and more than 500 invitations were called for answering through email. The answering was limited to maximum 500 and capped at 500 respondents. Majority of the participants (470) of total 500 were properly replied. The collected answers were processed into the SPSS, in which it statistically verified the accurate values and the confidence level and the variance and fed to the built-in software AMOS in the validation stage.

Table 1: Regression Estimation in DGEP Through ABCD Management Theory

	Factors	Unmodified Regression		Modified Regression	
		Unstandardized Estimates	Standardize Estimates	Unstandardized Estimates	Standardize Estimates
	Model ABCD1				
A1	Leadership for People	3.476	1	3.547	1
	People				
B1	People	0.296	1	0.290	1
	Process for People				
C1	Process for People	3.419	1	3.536	1
	People Result				
D1	People Result	0.116	0.098	0.104	1
	Key Result				
	Model ABCD2				
A2	Leadership for Strategy	1.616	1	1.616	1
	Strategy				
B2	Strategy	2.232	1	2.232	1
	Process for Strategy				
C2	Process for Strategy	0.952	1	0.952	1
	Customer Result				
D2	Customer Result	11.718	0.980	0.255	1
	Key Result				
	Model ABCD3				
A3	Leadership for Partnership & Resources	2.896	1	2.871	1
	Partnership & Resources				
B3	Partnership & Resources	0.938	1	0.913	1
	Process for Partnership & Resources				
C3	Process for Partnership & Resources	1.078	1	1.062	1
	Society Result				
D3	Society Result	0.113	1	0.157	1
	Key Result				

The final models used in the existing study only focus on the explanation on casual effect (Table 1) and the correlation between the studied factors. The overall conclusion indicates that the DGEP model validation process was successful and can be used as a reference for further improvements.

V. Conclusion And Future Work

In this paper, a theory of ABCD management has been introduced and expressed to describe and explain the effectiveness of ABCD Validation Method. ABCD Validation Method is grounded by the theory of a combination of quality management methods and best practice in validation methods, which may require improvements and modifications based on feedback from the ABCD validation practitioner. ABCD Validation Method focuses only on Business Excellence Models, but it can be expanded to cover other models such as Business Process Models and Decision Making Models which may be required for validation. ABCD Validation Method can be further developed in a form of software which can operate and provide validation through seamless information and data shared in a common platform or applied online and results can be obtained within any minimum time required.

The study shows that ABCD Validation Method is a very useful management tool for validation due to the fact that it is systematic and simple, while being easy to remember, implement and refine. In addition, path analysis in the ABCD Validation Method is a better version of the known path analysis techniques.

A practical ABCD Validation Method was developed as a management tool to enable researchers and practitioners to validate step by step and study a business excellence model with a systematic approach.

ABCD Validation Method also verifies the interlinks between components and their practices that enable a business model to achieve results. These enablers are verified through ABCD lenses "degree of well enabled" which accordingly will represent the effectiveness of the enablers in the model. ABCD Validation Method is a new method of a successful validation process which ensures simplicity, systematic working, while using a scientific step by step method to eliminate all the drawbacks and limitations of different techniques. In addition ABCD Validation Method is innovative, using an integrated framework containing various best practice techniques and methods at different steps of a validation process. When designing a conceptual model, it can either be a new Business Excellence Model or an existing one.

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