Activity-Based Management and Banking Health Assessment System

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ABSTRACT

The survival and growth of the banking industry, on the one hand, requires the trust and satisfaction of individuals in the community, on the other hand, requires financial health. In this research, we seek to evaluate the impact of activity-based management on indices of banking health in the banking system of IR Iran. The activity-based management tools examined in this study are activity-based budgeting and activity-based costing. The population of this study consisted of banks approved by the Central Bank of the Islamic Republic of Iran; however, as not all the banks provided the required information and due to the need to obtain reliable data, 19 banks, which had submitted financial statements for the year ending in **2017,** were chosen as study samples. Structural equation modeling and correlation analysis were used to investigate and answer the research questions. The results of this study showed that activity-based management techniques have a significant impact on banking health, and more precisely, activity-based costing is the most effective. In terms of prioritizing the components of ABC and ABB techniques, ABC training and ABB training have the first and second priorities, respectively. Next to these two components, "understanding, supporting, and engaging in strategy" as well as "acceptance and implementation by units" of ABC components bear more significance.

Keywords:
Activity-Based Management, CAMELS Banking Health Factors, Prioritizing, Bank.

1. Introduction

The Basel Committee on Banking Supervision (BCBS) was established by the central bank governors of the group of ten countries in late 1974 for proper and applicable supervision of the banking system and enhancement of the banking health worldwide. The Basel Committee holds four meetings on a regular annual basis; whereas its twenty five specialized work groups hold regular meetings, as well. The committee meetings are generally held at the Bank for International Settlements (i.e. the permanent secretariat of the Basel Committee). Currently, committee members include senior experts of banking supervision from Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Sweden, Switzerland, the United Kingdom, Spain, and the United States, and central banks or supervisory authorities represent the said countries in the committee. The committee was founded in response to a global necessity for cooperation in banking supervision, including providing supervisory guidelines and advice, and encouraging convergence in using standards and banking supervisory methods in member countries and other interested countries, with the aim of providing health and safety of the banking sector. Therefore, it is effective to observe the supervisory guidelines and advice proposed by the competent experts of the said committee to provide and maintain the health and safety of banks, and it is likely to pave the ground for prevention of problems, complications, and ultimately, baking crisis (Fattahi et at., 2017). A new wave of regulatory amendments and implementation of assessment systems has started for safer banks and more stable financial systems. In this line, the Banking Health Assessment System (CAMELS), which assesses the financial and management health of banks, has received attention from the world community and the Central Bank of IR Iran.

On the other hand, the new business conditions and equalization of interest rate set by the Central Bank of IR Iran, has seriously impacted the country banks, which mainly functioned around the rate-based bank deposit subscriptions (Rasoulof, 2014). Therefore, banks should implement strategies based on distinction and cost management in parallel to access competitive advantage and market acquisition; and by so doing, present new definitions of the new business fields and approaches, with appropriate and proportionate prices in the new economic environment.

In the new business environment, a successful bank is the one that maintains its banking health during the economic transition period while plans for urgent, effective, and most importantly, successful implementation of the abovementioned activities.

The activity-based management system originates from the belief that products consume activities and activities consume resources. Thus, activity-based management consists of a systematic method of analysis, planning, control, and cost improvement, focusing on the principle of consumed cost of activities. Unlike the traditional costing systems which focus on the employees, this system relies on the organization operations.

Activity-Based Management (ABM) focuses on utilization of the information obtained from activity-based budgeting and activity-based costing approaches for the purposes of activity management. Business enhancement based on the data obtained from activity-based budgeting and activity-based costing is called activity-based management (ABM). In fact, it is the analytical ABM which brings along the full benefits of activity-based budgeting (ABB) and activity-based costing (ABC) for organizations (Gunasekaran, et. al., 2000).

As financial-service institutions, banks play a determining role in cash flow and wealth flow of the community, and thus, they have a special stance in the economy of every country. As a result, optimal and effective activity of banks can leave significant impact on the growth of different economic sectors (Ahmadian, 2013).

Survival and growth of the banking industry, in one approach, requires the trust and satisfaction of the individuals of the community, and, in the other approach, it requires financial health, which itself is one of the prerequisites of the first approach.

In present situation, the necessity of using activity-based management system in banks to obtain fundamental changes is felt more than ever before. However, regarding the status of this system, its implementation receives attention and becomes operational when it leads to improvement is the financial health of banks.

Moreover, banks should identify the effective components of the activity-based management system on their banking health system before its

implementation, and carry out the implementation process with knowledge of the priority and significance of each of the afore-said components. It is in this case that banks can enjoy the positive consequences of these techniques by focusing on significant components at a lower cost.

In this research, the impact of two main activity-based management system, i.e. activity-based budgeting (ABB) and activity-based costing (ABC) on banking health assessment system is explored along with studying the prioritization of effective aspects of the above-said systems on the named system.

The point here is that there are no reports on concurrent impact of these two components of the activity-based management system on the banking health assessment system (which is indicative of the financial and management health of banks) and prioritization of effective components. If such reports are provided, the effectiveness or ineffectiveness of components will be identified, and in case of being effective, firstly, it will help determine which section of the activity-based management system impacts the banking health assessment system; and secondly, those banks which have not implemented the activity-based management system will be able to implement it with consideration of the priority of significant components. Therefore, the paper aims to examine the adoption of two main components Activity Based Management (ABM) (i.e. activity based costing (ABC) and strategic management (SMA)) by the banks of Iran. In addition, the paper examines the impact of the adopted ABM techniques on a bank's overall health.

2. Review Literature
2.1. Theoretical Foundation
Banking Health Assessment System

In 1978, the Federal Financial Institutions Examination Council consisting of senior managers of the US regulatory authorities, including the Office of the Comptroller of the Currency, the Central Bank of the United States, the Deposit Insurance Fund, the Office of Thrift Supervision, and the National Credit Union Administration, decided to design a standard rating system. In order to assess the financial and management health of the US financial institutions, these authorities chose the CAMEL approach in 1979. The term CAMEL is an acronym of the five factors for rating of financial institutions.

1) Capital Adequacy
2) Asset Quality
3) Management
4) Earnings
5) Liquidity Management

The CAMEL rating system was revised in 1996 to make it risk-based, and the sixth component called Sensitivity to Market Risk was to the said system, forming the CAMELS rating system.

The five factors of the CAMEL rating system are rated based on 21 qualitative and quantitative indicators with different weights as explained below. The eight quantitative indicators play a role in 47% of the final rate of the organization and the other thirteen qualitative indicators form 53% of the final rate.

Capital Adequacy:
1) Leverage Ratio of Capital indicates the relation between the base capital and the risk-weighted assets.
2) Capital Increase Capacity shows the ability to increase the capital at any time, if needed.
3) Reserve Adequacy is a degree according to which the public and private reserves of loans have the capability of absorbing the potential loan losses.

Asset Quality:
1) Portfolio Quality: ratio of non-performing loans to total loans.
2) Categorization of risk-based assets.
3) Bad debt policy (bad debts ratio)
4) Long-lived productive assets: organization policies for investment on fixed assets.
5) Organization's Infrastructures: this index assesses whether the existing infrastructures meet the demands of employees and customers.

Management:
1) Corporate Governance focuses on how appropriate the board of directors of the organization acts with regards to their specializations, their independence from management, and their ability effective flexible decision-making.
2) Human Resources assesses if the human resources manager provides proper guidance and support for operational personnel, including recruitment and training of new

workforce, motivational system for employees, and operation assessment system.

3) Processes, controls, and auditing: this factor focuses on the level of formality of key processes and effectiveness of risk controls across the organization.

4) Information Technology (IT) System: this factor assesses whether the computer systems operate efficiently and effectively, and produce and prepare managerial reports at the proper time and with sufficient accuracy for the manager. This analysis consists of IT environment assessment and quality assessment of IT controls.

5) Strategic Budgeting and Planning: this factor assesses if the organization considers the comprehensive and contributive processes in its short-term and long-term financial anticipations, and if these plans are updated, if needed, and used in the decision-making process.

Earnings:

1) Return on equity ratio (ROE) which shows an organization's capacity to maintain and increase its net value through operating income.

2) Operational efficiency measures the organization's efficiency by dividing the operating costs by granted loans.

3) Return on assets ratio (ROA) indicates that how effectively the assets of an organization are used.

4) Interest-rate policy: this factor assesses the degree according to which the manager analyzes and adjusts the loan (or deposit, if any) interest rates based on the cost of money, profitability goals, and the economic environment.

Liquidity Management:

1) Debt structure deals with assessment of debt composition, including settlement date, interest rate, settlement terms and conditions, and sensitivity to changes in the environment of macro-economy.

2) Resource abundance proportional to credit demands: this factor examines how an organization effectively receives its demanded credit in the shortest time possible.

3) Anticipation of cash flow assesses a bank's capacity to anticipate the requirements of its cash flow. This analysis focuses on anticipation of past and future cash flows to determine if these anticipations have the necessary details and analytical accuracy, and if previous anticipates predicted the cash inflow and cash outflow accurately and correctly.

4) Productivity of other current assets focuses on management of assets other than credit portfolio, particularly on cash and short-term investments. An organization is rated based on the maximum degree of using cash, bank accounts, and short-term investment by regular investment with maximum profit and according to liquidity needs.

As mentioned earlier, the CAMEL rating system was revised in 1996 and a new factor with the initial of S was added to denote the factor of sensitivity to market risk. This was, the CAMELS rating system was formed.

Activity-based Management (ABM)

Activity-based management focuses on employing the information obtained from activity-based budgeting and activity-based costing approaches to manage activities. Business enhancement based on the information obtained from activity-based budgeting and activity-based costing approaches is called activity-based management. In fact, ABM is a managerial analysis that brings along the whole benefits of activity-based budgeting and activity-based costing for organizations.

Factors of Activity-based Management

Activity-based costing (ABC) allocates the coming costs based on a certain activity to produce a certain product or provide services (Kaplan, et. al., 2004).

Based on the definitions proposed for activity-based budgeting, it is an annual plan, along with the annual budget which is yielded from the relation between the amounts allocated to each plan and the outcomes obtained from that plan. It means that a certain set of goals must be realized in accordance with the amount of expenses in the operational budgeting (Panahi, 2005).

2.2. Review of Related Literature

Shahzadi et. al. (2018) studied the effect of internal and external factors on accounting management

methods in Pakistan and stated that management accounting differences are significantly impacted by environmental uncertainty. And the direction of the relation between significant variables confirm the previous expectations. On the other hand, the data do not support expectations about the significant relation between market competition and interrelation strategy. This study showed that there is a need in Pakistan to awareness and understanding the use of management accounting operations in small companies, so that small companies can increase their productivity at a low cost and improve their performance.

Amara and Benelifa (2017) explored the impact of external and internal factors on accounting management methods, stating that management accounting methods are usually used in reviews of literature, when all activities are carried out by the organization to minimize its expense, improve productivity, provide suitable information, and reduce business resources. Most researchers have spoken about acceptance and implementation methods of management accounting is developed and developing countries. Management accounting methods have an outstanding place in culture to exchange modern accounting techniques, which are summarily explained by many of likely factors, including internal and external factors.

Abdollah et.al. (2016) explored the management accounting methods in world trade environments in the Middle East, expressing that financial and non-financial techniques are added to the current management accounting. The objective of this process is to provide information at operational and organizational levels. The goal of management accounting is to offer financial and non-financial information required by managers, investors, and the personnel.

Having studied the management accounting methods in hoteling industry in Yogyakarta-Indonesia, Sunarni (2015) holds that management accounting of organizations plays an important role in the management process. This tool helps provide objective information for planning, assessment, control, and decision-making in business. The manager receives and activates the information from management accounting.

In a study, Ayadi and Affes (2014) explored the impact of environmental uncertainty on using new management accounting tools. Research results show that environmental uncertainty has a significant effect on the amount of using new management accounting tools. Moreover, environmental uncertainty has a positive impact on the performance of companies due to usefulness of the management accounting tools.

In his study, Amel Ben (2012) addressed the subject that using value management together with activity-based costing can help managers approximate the profit margin and analyze customer satisfaction.

Findings of Al-Nasser and Li (2008) of banks of China illustrate that lack of a clear objective, lack of adequate training for activity-based costing, weak model design, lack of participation of organization's human resources and their resistance against change include main reasons that implementation of activity-based costing has not become feasible in banks of China.

Fuster (2007) showed that 92% of sample banks in Spain are familiar with the concept of activity-based costing, among which 31% practice it, 34% are tackling it, and 27% do not exercise it.

Noting that banks have moved away from the stage of focusing on the source of profitability towards the stage of customer profitability, Rezaei (2005) addresses the significance of information in decision-makings. He believes that if an intra-organizational costing system fails to conform to the extra-organizational financial reporting system, there will be no basis for operation assessment and data reliance.

Soumar et. al. (2018) studied the evolution of management accounting tools, as a solution to reduction of the ominous shadow of opportunist restatements, stating that it is mandatory in the present commercial environment to correctly use the new management accounting tools, which assist companies in reaching their goals and obtaining competitive advantages better. Moreover, due to failure to realize the anticipated objectives, all companies in the first stage of evolution restate their financial statements; but companies in the fourth stage of evolution have non-opportunist motivations for restatement of their financial statements. Therefore, it can be said that companies based on value-creation can cause reduction in the number of restatement and shifting of the restatement motivation from an opportunistic one to a non-opportunistic one. Further, auditing quality variables and effective tax rate adjust the effectiveness of management accounting tools on restatements.

Having studied the effect of economic and human factors on using management accounting tools (in companies admitted in Tehran stock exchange), Kashanipour et. al. (2018) expressed that management accounting is a measurement system for gathering financial and operational data leading management activities. Company managers need to know the behavior of their earnings, costs, and the risk of losing control of their company performance. In this line, they use management accounting data to decide about carrying out activities in research and development, budgeting, product design, pricing, and supplying goods and services demanded by customers.

Vatanparast et. al. (2018) reviewed the history and techniques of management accounting, stating that management accounting is one of the specialized majors in accounting that was offered due to the need felt for it. Nowadays, successful production units, including Toyota, utilize these techniques. It is clear that management accounting changed by the passing of time and the shift in needs; changes which were effective in this situation of global competition caused by customers' choice option, technology advances, globalization, etc.

Zarei and Bargezar (2017) examined the impact of data illustration in management accounting reports on managers' decision-making, expressing that nowadays, as the volume of information increases, managers encounter the rise in information load and the increase of pressure on effective decision-making. Therefore, the decision-making process in management accounting has become difficult; however, the big challenge is that how information and data should be collected as to lead to facilitation and organization of the decision-making process. Data illustration indicates a method of overcoming this challenge and improving the quality of managers' decision-makings and reports. The findings demonstrated that managers were able to make better decisions and received very high scores when they were presented by tables and diagrams; but they showed a weak performance when they received the information only in the form of tables. Additionally, the findings stated that regardless of the type of the information provided, managers placed more trust in university students than in their own decisions.

In a study entitled "Decision-making and Management Accounting: two case studies of outsourcing", Filsaraei et. al. (2016) explored the use of management accounting data in two reputable construction companies, under decision-making conditions which were significant in terms of being strategic and complicated. Conditions included several participants in decision-making with potentially paradoxical priorities, the ability of obtaining limited information, and ambiguities about financial consequences of the options in the alternative decision. The two case studies revealed two different methodologic solutions for decision-making; the analytic and the actor-based solutions. These solutions considerably use different data ambiguity management methods, the theory of interaction for unity among decision participants, and employing management accounting techniques. Their findings showed that management accounting data and techniques play an important role in the strategic and complicated organizational decision-making. The proposed methods provided potential training examples for organizations' learning. The findings stated the simple nature of papers on contractual management accounting on decision-making (e.g., outsourcing, construction, or purchase).

Dianati et. al. (2016) addressed the relation between application of advanced management accounting tools and economic value added. After analyzing 13 questionnaires filled out by companies admitted in Tehran stock exchange, they realized that using new management accounting tools has a positive significant effect on the economic value added index.

Kamali et. al. (2014) used the BAdtcher(2012) method to investigate the impact of restatement and its types (opportunistic or non-opportunistic) on the growth of companies admitted in stock exchange. Moreover, the results showed the impact of the type of restatement on growth rate of external financial supply of companies, regardless of the restatement motivations.

Hajiha and Kharatzadeh (2014) carried out a research entitled "Studying the Relation between Application of Management Accounting Innovations and Financial Factors of Performance Assessment". The said financial factors include return of assets, return on equity, and return on sales. In view of the results obtained in this study, there is a significant relation between return on assets index and application of innovations in management accounting. However, this relation does not hold for return on equity and

return on sales and application of innovations in management accounting.

Namazi and Nazemi (2011) calculated and compared the net cost of electronic banking services in Keshavarzi Bank based on the two traditional and ABC systems. Findings showed that the net cost of electronic services was lower than the cost of these services at the counter. Moreover, the findings confirmed the presence of a significant difference between the ABC and the traditional systems. Having examined 470 branches of Keshavarzi Bank in 2008, the study showed that the net cost of services rendered in 364 branches through the ABC system was lower than the cost of same services through the traditional system. These findings were also tested at the level of bank assessors through questionnaires and similar results were obtained.

Rahnamai Roudposhti et. a. (2009) examined the operational and financial data of Mehr Institution and Bank Saderat of West Azerbaijan Province, showing that the method of calculation of net cost in the two banking systems of the country is not appropriate in terms of scientific and Islamic banking regulations. They also showed that there is a significant difference between the net cost computed by ABC method and the current traditional techniques.

Anvari Rostami and Rezayat (2007) used the model of the US AMIFS (Association for Management Information in Financial Services) to calculate and compare the net cost of banking services under the traditional and activity-based costing systems for loans granted in the Central Branch of Tose' Saderat (Export Development) Bank in 2004. The findings of their study revealed that there is a significant difference between the net cost of loans granted through the two methods of costing in the form of installment-based sales, civil participation, and interest-free contracts. More elaborate numerical analysis indicates that in the traditional costing method, the interest-free net cost is less than the net cost of civil participation and installment-based sales. Meanwhile, civil participation and installment-based sales had equal net costs.

3. Methodology
3.1. Hypotheses

Regarding the objective of this project, which centers around determining the priority of factor of activity-based management techniques based on effectiveness of these techniques on banking health assessment system, the major hypothesis of this research is as follows:

1) Does activity-based management have an effect on the banking health assessment system?

Likewise, the minor hypotheses of the research are:

1) Activity-based budgeting (ABB) is effective on the banking health assessment system.
2) Activity-based costing (ABC) is effective on the banking health assessment system.

This study does not propose a hypothesis for prioritization.

3.2. Methodology

The present research is an applied study, because it seeks to obtain a scientific objective and focuses on problem solving. It involves a set of methods whose objectives are describing the conditions or the phenomena of the case study (Hosseini et. al., 1388). Considering the method, it can be regarded as a correlational descriptive study.

The SPSS and LISREL software, structural equation modeling, the Kolmogorov-Smirnov test, and Spearman's Correlation Analysis were used for analysis of the collected data. The population of the case study consists of all active banks of Iran; however, since there was no access to information of some of the banks, and regarding the necessity of obtaining reliable financial information, 19 banks were selected as the sample population.

The field and library methods of data collection are used in this study. Library research is used as a foundation for forming the theoretical framework of the study, as well as for accessing data pertaining to banking health assessment system of banks. The field method is utilized to calculate the quantitative indices of banking health assessment system based on the banks financial statements and questionnaire distribution to obtain information from banks about activity-based management and the qualitative index of banking health assessment system. Therefore, the data for this study is collected by examining the financial statements of banks and distribution of questionnaire among samples of this population.

Three statistical populations are considered in this study:

A) Research-Statistical Population

This statistical population will be used for identification of activity-based management factors, as well components effective on activity-based management processes, and components of banking health assessment system. This population consists of all papers authored for identification of activity-based management components, components effective on activity-based management processes, and components of banking health management system. Criteria such as papers relating to scholars of activity-based management and banking health assessment system, published in authentic university journals, ISI, and domestic or online research-scientific journals are assumed for validity assessment of the papers.

B) First statistical population of experts

This population is defined for examination of validity of activity-based management components, components effective on activity-based management processes, and components of banking health assessment system, in accordance with the potential conditions and facilities; examination of questionnaire validity, and ultimately, in some cases, for examination of overall validity of the study. The members of this population consisted of faculty members of accounting and banking fields of study, who were specialized in these areas and had papers on all components of activity-based management, components effective on the activity-based management processes, and components of banking health assessment system. The number of members of this population was small and included easily accessible individuals.

Table (1): Examination of Reliability of Research Questionnaire

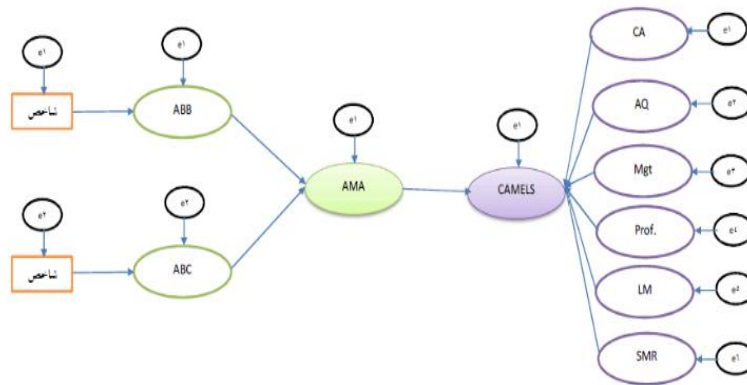| Variables	Components	Cronbach's Alpha Coefficient
Activity-based Management	Activity-based Budgeting	0.886
	Activity-based Costing	0.896
Qualitative Indices of Banking Health Assessment System		0.813

Figure (1): Conceptual Research Model

C) Second statistical population of experts

In the second stage, the statistical population consisted of experts proficient in activity-based management, components effective on activity-based management processes, and components of banking health assessment system in organizations mentioned in the territorial section of the study. The experts and specialists, who form the statistical population of this study, will be selected from individuals who have had managerial positions in management of the organizations examined in this study, and have at least one the following features: a) holding an academic (bachelor's or higher) degree; b) having reports, studies, or scientific papers in areas of activity-based management, components effective on activity-based management processes, and components of banking health assessment system.

The questionnaire will be sent to be filled out by senior bank managers. In this study, the Cochran formula is used to yield the volume of the used sample. The figure obtained is equivalent to 250 which is indicative of the volume of the given sample based on the given formula.

The validity analysis and reliability analysis of the questionnaire is also discussed in this study. Besides using the Delphi method to increase the validity coefficient of selected variables, the questionnaire designed for this study was handed over to experts, including competent bank managers and university professors.

Cronbach's alpha and SPSS are used to examine the reliability of the questionnaire. As a general rule, the minimum acceptable amount, or in other words, the required amount of alpha, for an index is considered to be 0.7, and if the alpha coefficient is equal to or larger than this amount, the measurement tool is highly reliable and yields more reliable results.

Therefore, Cronbach's alpha is used on SPSS to assess the reliability of the research questionnaire. 30 questionnaires are distributed as the primary sample, and SPSS is used to apply Cronbach's alpha in calculation of the reliability coefficient of the collected questionnaires. The results in Table (1) indicate high and significant coefficients in many of the variables and items of the model.

SPSS22 software, the Kolmogorov-Smirnov test, Spearman or Pearson's Correlation Analysis, and structural equation modeling will be used for analysis and testing of research hypotheses.

Figure (1) shows the proposed model used in this study. The research questions will be answered and the indices will be prioritized based on the coefficients used in this research.

D) Structure Equation Model

SEM is a technique that can handle a large number of endogenous and exogenous observed variables simultaneously. Since SEM consists of a set of equations that are specified by direct links between variables, it can be called "the simultaneous equations" from the perspective. However, in SEM, we can introduce „latent variables" which are the unobserved variables and represent uni-dimensional concepts in their purest form. Other terms for these are unobserved or unmeasured variables and factors. The observed variables of a latent variable contain random or systematic measurement errors, but the latent variable is free of these. Since all latent variables corresponding to concepts, they are hypothetical variables. Latent variables specified as linear combinations of the observed variables. The linear combinations are weighted averages. Hence, regression, path analysis, factor analysis and canonical correlation analysis are all special cases of SEM. In SEM we can separate errors in measurement from errors in equations (Sunyoungahn, 2018).

4. Results
4.1. Kolmogorov-Smirnov Test to check normality of research variables

In Kolmogorov-Smirnov test, the main goal is to identify the frequency distribution function of the case study data. Table (2) indicates that all variables follow the normal distribution function, and, thus, considering the statistical sample (over 30 persons), it is possible to use the confirmatory factor analysis and path analysis for analysis of the research data.

Table (2): Results of Kolmogorov-Smirnov test

Parameters		ABB	ABC
Normal Distribution Parameters	Mean	.5109	.5043
	Standard Deviation	.14194	.12808
Values of Difference	Absolute	.034	.047
	Positive	.032	.041
	Negative	-.034	-.047
K_S Statistic		0.662	.532
Significance Level		0.773	.940

In order to check the validity of the designed questionnaire, it was presented to be read by some experts, including supervisors, some other relevant university professors, as well as some researchers and managers in the organizations of study, and their valuable inputs were taken into account. Therefore, the questionnaire used in this study has the required validity.

4.2. Analysis of Independent Research Variables

Comparison of activity-based management mean against gender is illustrated in the table below. According to Table (3) and t-test of the two independent samples, it can be said that the significance level of activity-based management in an organization does not have a significant difference in gender groups.

Table (3): Effect of Gender on Significance Level of Activity-based Management in an Organization

Factor	ABB	ABC
Significance Level	0.206	0.812

Table (4): Effect of Education Level on Significance Level of Activity-based Management

| Factor	ABB	ABC
Test Statistic	1.173	0.503
Significance Level	0.311	0.606

Analysis of the mean difference of activity-based management against education levels was performed based on variance analysis, and as per Table (4), it can be stated that the significance level of activity-based management in an organization does not have a significant difference among education levels.

4.3. Review of Exploratory Factor Analysis to Assess the Validity of Research Questions

Table (5) represents the exploratory factor analysis used to assess the validity of questions. Factor reliability is a form of construct reliability obtained from factor analysis. Factor analysis is a statistical technique. In fact, it is essential to use factor analysis in areas where questionnaires and tests are used and variables are latent.

Exploratory factor analysis is not required in areas where an infrastructural notion and aspect, as well as its indices, are known. This type of analysis is usually used in identification of infrastructural aspects of an unknown area. If the area and its aspects for research are known to the researcher by review of literature, confirmatory factor analysis can be employed directly. In this study, the primary 18 factors of these variables were extracted by using the exploratory factor analysis technique of first order, whose results are tabulated in Table (5).
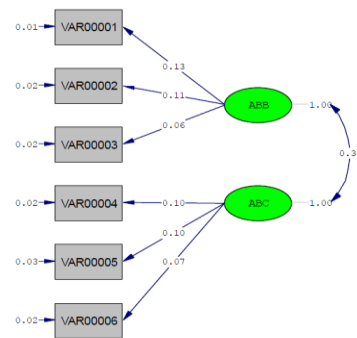
Chi-Square=7.54, df=8, P-value=0.47944, RMSEA=0.000

Figure (2): Approximation Model of Activity-based Management Construct

Table (5): Exploratory Factor Analysis for Validity Assessment of Questions

Indices	Activity-based Costing	Activity-based Budgeting
Manager's support	.803	.120
Acceptance by Units	.697	.216
Training	.695	.094
Manager's support	.387	.678
Acceptance by Units	.091	.596
Training	.174	.463

4.4. Review of Findings of Confirmatory Factor Analysis

The approximation model of activity-based management construct in terms of its constituting components, as mentioned in Figure (2), is shown below. In the same manner, the level of impact of comprehensive quality management indices, balanced scorecard, and value-based management on activity-based management is explained.

For validity, there must be a positive significant correlation between construct and dimension, and between dimension and index. The standard approximation model is the model that is yielded by adjustment of two covariance matrices of data model, and shows the approximation of model parameters. In this model, the ratio of construct to dimension, and dimension to index, are demonstrated. If the ratio is over 0.6, it can be stated that the given question has a higher explanatory power. As it is observed, all given indices for the activity-based management factor, have correlations of almost more than 0.6. This model is based on partial correlation coefficients which do not allow comparison among indices; therefore, the standard approximation model is presented. In terms of fit indices, the model is in a relatively appropriate state. The value of K/2 degrees of freedom is slightly different from the permitted value of 3. The RMSEA value of the model is equal to 0.000 and less than 0.08. Moreover, other goodness of fit indices, including Comparative Fit Index (CFI), Normed Fit Index (NFI), and Goodness of Fit Index (GFI) have values larger than the permitted value of 0.80.

All significant figures of all model parameters are larger than the figure 1.96; therefore, the correlation of the model for measuring the related variable is confirmed.

The results of covariance analysis, as per the table above, show that there is a two-by-two positive significant inclination between dimensions; meaning that any improvement or increase in one of the dimensions of activity-based management will be coupled with increase in other dimensions. Generally, all acceptable values of fit indices and approximations relevant to exogenous variables are illustrated in Table (6).

The approximation model of endogenous constructs and, in other words, the construct of the banking health assessment system based on its constituents are shown in the order mentioned in Figure (4).

All given indices for endogenous constructs have correlations of almost more than 0.6. This model is based on partial correlation coefficients which do not allow comparison among indices; therefore, the standard approximation model is presented. In terms of fit indices, the model is in a relatively appropriate state. The value of K/2 degrees of freedom is slightly different from the permitted value of 3. The RMSEA value of the model is equal to 0.039 and less than 0.08.
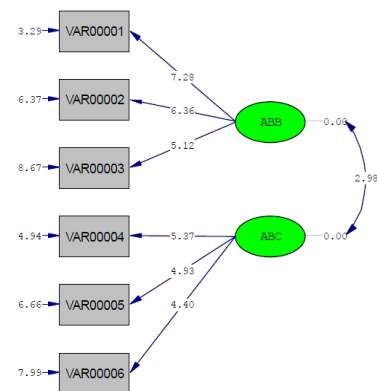
Chi-Square=7.54, df=8, P-value=0.47944, RMSEA=0.000

Figure (3): Significant Figures Model of Activity-based Management Construct

Moreover, other goodness of fit indices, including Comparative Fit Index (CFI), Normed Fit Index (NFI), and Goodness of Fit Index(GFI) have values larger than the permitted value of 0.90.
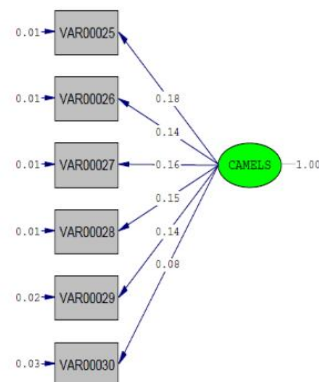
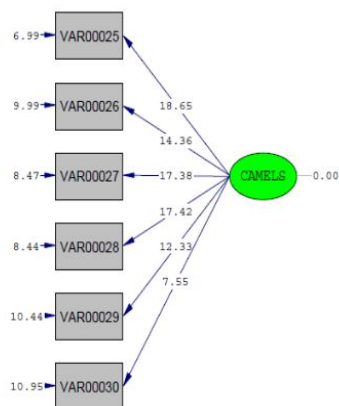Chi-Square=12.42, df=9, P-value=0.19066, RMSEA=0.039

Figure (4): Approximation Model of Endogenous Constructs

Table (6): Fit Indices of Confirmatory Factor Analysis Model-Exogenous Variables

Index	Main Model Approximatoins	Acceptable Values of Fit Indices
(K/2 Degrees of Freedom)	1.50	Less than 3
GFI (Goodness of Fit)	0.99	More than 0.8
AGFI (Adjusted Goodness of Fit Index)	0.97	More than 0.8
RMSEA (Root Mean Square of Error Approximation)	0.000	Less than 0.08
CFI (Comparative of Fit Index)	1.00	More than 0.9
NFI (Normed Fit Index)	0.95	More than 0.9
NNFI (Non-Normed Fit Index)	1.01	More than 0.9
IFI (Incremental Fit Index)	1.00	More than 0.9

Table (7): Fit Indices of Confirmatory Factor Analysis Model-Endogenous Variables

Index	Main Model Approximations	Acceptable Values of Fit Indices
(K/2 Degrees of Freedom)	1.38	Less than 3
GFI (Goodness of Fit)	0.98	More than 0.8
AGFI (Adjusted Goodness of Fit Index)	0.96	More than 0.8
RMSEA (Root Mean Square of Error Approximation)	0.039	Less than 0.08
CFI (Comparative of Fit Index)	1.00	More than 0.9
NFI (Normed Fit Index)	0.99	More than 0.9
NNFI (Non-Normed Fit Index)	1.00	More than 0.9
IFI (Incremental Fit Index)	1.00	More than 0.9

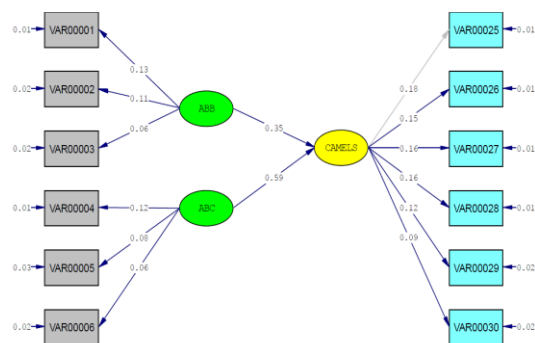Chi-Square=12.42, df=9, P-value=0.19066, RMSEA=0.039

Figure (5): Significant figures model of endogenous constructs

the model for measuring the related variable is confirmed.

Chi-Square=45.30, df=51, P-value=0.69868, RMSEA=0.000

Figure (6): Research approximation model

After identification of the conceptual model and the standard and non-standard approximation model, the significant figure model will be presented. This model is addressed to determine the significance of the ratio between the construct and the dimension, and the ratio between the construct and the index.

System and the value creation and allocation process is approximated to be smaller than the figure 1.96.

All significant figures of all model parameters are larger than the figure 1.96; therefore, the correlation of

The results of covariance analysis, as per the table above, show that there is a two-by-two positive significant inclination between dimensions; meaning that any improvement or increase in one of the dimensions of the endogenous variables construct will be coupled with improvement and increase in other dimensions. Likewise, all acceptable values of fit indices and approximations relevant to endogenous variables are illustrated in the Table below.

Considering the confirmatory factor analysis and assessment of level of effectiveness of each of the

indices on the given variables, the path analysis of the ratio among variables will be presented in this section.

Hypotheses of the measurement model: there is a positive correlation among relevant latent variables and their corresponding indices. In terms of fit indices, the model is in a relatively appropriate state. The RMSEA value of the model is equal to 0.019 and less than 0.08. Moreover, other goodness of fit indices, including Comparative Fit Index (CFI), Normed Fit Index (NFI), and Goodness of Fit Index (GFI) have values larger than the permitted value of 0.90. Regarding the determined relations, significance coefficients relating to the ratio of variables of the banking health assessment.
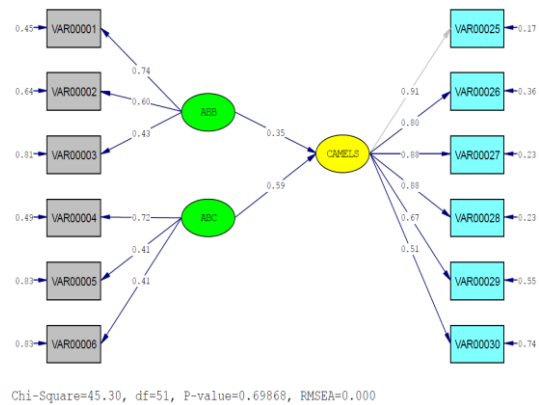

Chi-Square=45.30, df=51, P-value=0.69868, RMSEA=0.000

Figure (7): Research standard model

Table (8): Fit Indices of Confirmatory Factor Analysis Model-Endogenous Variables

Index	Main Model Approximations	Acceptable Values of Fit Indices
(K/2 Degrees of Freedom)	0.888	Less than 3
GFI (Goodness of Fit)	0.96	More than 0.8
AGFI (Adjusted Goodness of Fit Index)	0.94	More than 0.8
RMSEA (Root Mean Square of Error Approximation)	0.000	Less than 0.08
CFI (Comparative of Fit Index)	1.00	More than 0.9
NFI (Normed Fit Index)	0.94	More than 0.9
NNFI (Non-Normed Fit Index)	1.01	More than 0.9
IFI (Incremental Fit Index)	1.00	More than 0.9

When working in LISREL, each of the indices obtained for the model does not indicate its fitting or non-fitting alone; these indices should be interpreted together and alongside one another. There are several fit indices to assess the confirmatory factor analysis model, and the path analysis model. In this study, the indices of K/2 ($\chi 2$), root mean square residual (RMSR), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), normed fit index (NFI), non-normed fit index (NNFI), incremental fit index (IFI), comparative fit index (CFI), and the very important index of root mean square error of approximation (RMSEA) are used to assess the confirmatory factor analysis model.

The $\chi 2$ test is known as the success index. This index simply shows whether the structure model describes the relation among observed variables. The smaller the $\chi 2$ is, the better. This index is usually true under multivariate normal distribution, and it is sensitive to sample size. Because a model may be fit in a small size, but become unfitting when the sample gets large. Some researchers use this ratio as the substitute index. However, this index also has some limitation similar to those of $\chi 2$. There is no certainty in the ratio of square of K/2 of $\chi 2$ to degrees of freedom, and in resources, any value under 3 is acceptable, whereas in the present model, this value is calculated to be 1.086. The GFI factor indicates the value of relative value of variance and covariance, determined by the model.

This factor ranges between zero and one, whereas the closer it gets to one, the more goodness of fit index. In general, the larger GFI gets than 0.8 in the structural equation modeling, the better status the model will have in terms of this index (Jazerkag and Surbol, 1988). The amount of reported GFI is 0.9. the very powerful root mean square of error approximation (RMSEA) is used to examine how the

certain model combines fitting and saving. The RMSEA index is the root mean square of approximation. This index is 0.05 or less in good models; the trivial amount of RMSEA in this model is figured out to be 0.000 which indicates the proper verification of covariance. The normed fit index (NFI), non-normed fit index (NNFI), incremental fit index (IFI), and comparative fit index (CFI) are utilized to examine how well a model acts, especially as compared to other potential models, in verification of a set of observed data. Amounts larger than 0.9 for these indices indicate that, as compared to other potential models, the designed model is very appropriately fitting. Ultimately, a model with the index of 0.9 or lower has a weak fitting.

Generally, the acceptable values of fitting indices and main model approximations are illustrated in Table (8).

Effectiveness of activity-based management techniques on level of banking health is shown in Figure (8). Significant coefficients are indicative of the positive powerful effect of activity-based management on factors of the banking health assessment system.

Table (9): Analysis of indices of ABM in SEM

Factor	Factor Coefficient	Index	Index Coefficient	Normalized Score	Index Rank
Activity-based Budgeting	0.35	Training	0.74	0.169	2
		Acceptance and implementation by units	0.6	0.137	5
		Understanding, supporting, and engaging in strategy	0.43	0.098	6
Activity-based Costing	0.59	Training	0.72	0.277	1
		Acceptance and implementation by units	0.41	0.158	4
		Understanding, supporting, and engaging in strategy	0.415	0.160	3

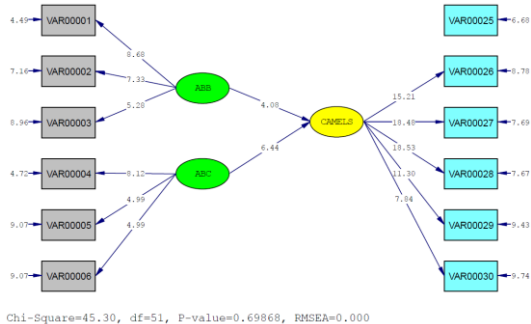Chi-Square=45.30, df=51, P-value=0.69868, RMSEA=0.000

Figure (8): Research significant numbers model

Tables (9) and Figures (6-8) show parameters estimated in the models, t statistics, and p-values. According to parameters estimated, first of all, considering T-values which are greater than 1.96 for both ABB(4.08) and ABC(6.44), we conclude that our that main and minor hypotheses are accepted. It means that ABM in general has significant impact on CAMELS and, on the other hand the coefficients of ABC and ABB are significant.

ABC has the highest value of parameter as 0.59 followed by ABB with 0.35. However, in prioritizing sub-criteria, based on normal weights, training of ABB with 0.169 has the 1st preference followed by training of ABC, acceptance and implementation of ABC by units and Understanding, supporting, and engaging of ABC in strategy.

5. Discussion and Conclusions

The results of the analysis on the existing data, as in Table (9), illustrates that activity-based management is effective in promotion of banking health. This important finding can be proven based on significance of the figures obtained in tests as well as the positive coefficients.

It means that in order to improve the banking health, banks must employ the activity-based management more seriously than ever before and implement its components. The significant point is that considering the time-consuming and costly nature of implementation of these techniques, on the one hand, and the necessity of banking health improvement for banks as a supervisory requirement set by the Central Bank of IR Iran, on the other hand, how and in what order should the components of the activity-based management factors be prioritized for implementation.

Significance of figures for model testing and examination of coefficients demonstrate that activity-

based costing is more effective when comparing the components of activity-based management.

In case of ABC, "training", "understanding, supporting, and engaging in strategy", and "acceptance and implementation by units" are placed in first to third ranks, respectively. Regarding ABB, although "training" ranks first, "acceptance and implementation by units" preceded "understanding, supporting, and engaging in strategy", gaining the second rank.

The results of analysis on the existing data, as per Table (10), demonstrate that, among the components of banking health assessment system, the impact of activity-based management components was not very significant on capital adequacy. The reason may be the slight changes in capital adequacy among banks, and it can be stated that since even banks with approximately stable (regarding other indicators) do not have a very acceptable capital adequacy, thus, this factor cannot be improved alone with the approach of activity-based management, and other components are required, as well. For other indices of banking health assessment system, earnings, management, asset quality, liquidity management, and sensitivity to market risk, respectively, are most impacted among activity-based management factors.

Activity-based management facilitates obtaining banking health but is faces some challenges in practice. In other words, environmental uncertainty has a significant impact on the rate of using new management accounting tools. The impact of employing new management accounting tools on the economic value added index is positive and significant. Dianati Deilami et. at. (2015) state that the more companies use more advanced tools for management of management accounting evolution stages, their operational profit will increase proportionally. Nevertheless, there is an exception in this case. Companies that use cost management tools in the second evolution stage of management accounting have a higher operational profit than the companies which use cost management tools in the third and fourth stages.

Moreover, Amel Ben (2012) stated that value management and activity-based costing, together, can assist managers to anticipate profit margins more accurately and analyze their customer satisfaction.

Regarding that activity-based management techniques have a significant influence on promotion of banking health of banks, the following recommendations are set forth:

1. The Central Bank of IR Iran, and accordingly, banks and financial institutions, propose required guidelines to provide the suitable environment for establishment of activity-based management and implementation of its techniques. In this respect, establishment of activity-based management facilitates and accelerates the promotion of banking health. In this line, it seems appropriate that the Central Bank of IR Iran notify the management costing conceptual framework, drafted by the US Association of Management Accountants.

2. Operational auditing and disclosure of its report in venture capital associations should be made mandatory for banks to oblige banks and credit institutions to implement different management accounting techniques, including activity-based management. Thus, banks will be more willing to implement management accounting techniques and persist in their implementation in order to obtain proper reports and prevent unproductivity in various fields at managerial levels. Because researchers have found that there is a strong will in organizations to use activity-based tools; however, the conditions and situations of commencing or terminating it are not fully understood.

3. considering the necessity of supplying the training and cultural prerequisites of employees, banks and financial institutions should implement the activity-based management gradually. In this line, and regarding the findings of the present study, activity-based costing technique is implemented by focusing more on personnel training and lifting the spirit of acceptance in employees as the topmost priority; this way, the "management" quality, as one of the factors of banking health assessment system, will increase in them. In the next step, considering the influence of activity-based budgeting technique on banking health assessment system, it is recommended that this technique be also implemented; and in a more evolved state, it is suggested that the activity-based management system be implemented by concurrent implementation of activity-based costing and activity-based budgeting. By so doing, managers of banking network will be able to observe and analyze the outcome and consequences of their decisions before implementing them; and make required amendments, if needed, in a timely manner.

4. As that banks and financial institutions are instable in "profitability", which is deemed to be one the components of the banking health assessment system, due to their inaccurate costing of banking services, and subsequently, improper pricing of these services, and they are not able to cover their non-common (administrative-organizational) expenses by their non-common earnings (banking fees); the Central Bank of I.R.Iran can revise and amend the banking fees through more accurate costing methods, including activity-based costing, and even take a step further, and allow free pricing of banking services, and assign this duty to banks and financial institutions in a competitive environment.

Table (10): Fit Indices of Confirmatory Factor Analysis Model-Endogenous Variables

Factor	Factor Coefficient	Error Coefficient	Significant Figure	Significance Status	Factor Rank
Capital Adequacy	0.91	0.17	Less than 1.96	Insignificant	-
Asset Quality	0.80	0.36	15.21	Significant	3
Management	0.88	0.23	18.48	Significant	2
Earnings	0.88	0.23	18.53	Significant	1
Liquidity Management	0.67	0.55	11.30	Significant	4
Sensitivity to Market Risk	0.51	0.74	7.48	Significant	5

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