

## Compatibility of accounting information systems (AISs) with activities in production cycle

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### ABSTRACT

The intricacies of economic activities and growing increase in competition have made commercial units with the duty of production and financial data processing, orienting themselves with production cycle. This is considered as the heart of organization such that they could be more effective in decision-making. The method adopted in this research is descriptive – survey and it attempts to attain the objectives the researchers based on four independent variables including Production design, Programming, production operations and cost accounting. To test the hypotheses, the study adopts one sample T test method and to investigate uniformity of effects of each variable, Kruscal-Wallis test is employed. The results obtained from the tests indicate that AISs are not compatible with production cycle, where, in turn, has led to rejection of modern costing systems such as activity based costing (ABC).

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## 1. Introduction

Developing countries always require preparation in modern costing system (MCS) to prepare themselves to take active participation in global markets and create competitive advantage. During the first decade of 21<sup>st</sup> century, financial managers have merely been able to afford to spend around 10 to 20 percent of their working times on reporting and appraisal affairs. This means that modern and conventional accounting and financial reporting systems have become automatic and routine. Financial managers cannot be useful for their institutions unless they can help them in decision-making process and drawing necessary guidelines. During the past few years, financial managers are requested to spend much of their working time on analysis, investigation and interpretation of opportunities as well as decision-making in management (Hilton et al., 2000). For years, many industries around the world have attempted to use advanced technological management techniques such as total quality management (TQM), just in time (JIT) production system to increase their

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efficiencies. In most developed countries as well as some developing countries and in the field of information technology (IT), economy and commerce have had major influences on production methods and performance of appraisal systems. Modern techniques such as objective based costing (OBC), activity based costing (ABC), life cycle costing (LCC), quality cost reporting and strategic management accounting (SMA) have been devised and utilized .

Despite the fact that business units have utilized modern management techniques, which require tremendous change in production methods and machinery, appraisal systems are still facing severe criticism. In this study, we conduct a review in the literature of accounting information systems (AISs), production cycle, importance of compatibility and control in organizations, compatibility of AISs with the four major activities of production cycle. These activities include Product Design, Production Planning, Production Operations and cost accounting to build clear insights into the status of active manufacturing firms located in Zanjan- Iran in the realm of AISs.

## **2. Literature review**

Information provided for managers by AISs are designed for use in various ways, specifically. Researchers in accounting concentrate more on three characteristics namely focus, assessment and time horizon (IMA, 1995). Focus signifies the extent in which data is internally collected and that this signification refers to organization, for instance the rate of productivity in occupations, or external focus on factors, which are relevant to environment such as economic conditions. Evaluation and measurement are indicative of financial data including interest margin or non-financial data such as the rate of absenteeism explained under non-financial conditions (Mia, 1993). Time horizon normally reflects historical weekly or monthly data or decisive future of data prediction such as the probability of calculation in a forthcoming project. These three characteristics can be described as the basis for the realm of AISs. Conventionally designed AISs maintain relationship with internal financial data along with past time horizon in organization. Thus, in a smaller realm AISs only incorporate internal, financial and historical data. In other words, any excess in internal, financial and historical data and the vast extent of AISs incorporates external, non-financial and future-centered data. The structure of management accounting system is implemented in different accounting studies (Gul & Chia, 1994; Chong & Chong, 1997; Ismail & King, 2005).

### *2.1 The importance of compatibility*

According to Byrd and Turner (2000), compatibility is a smooth productive system in line with operations of staff and organizational structure and it is a capacity of any type of data and technology in organizations. In fact, a system, which is not compatible with organization, is doomed to failure. Organizations concentrate on helpful information for implementation in their information systems and compatibility plays essential role in data concentration. An organization whose information systems are not compatible will have problems in data concentration (Chapman & Kihn, 2009). The user must consider providing decision makers with timely accurate information and the data will not be useful unless it is provided in a timely manner. Therefore, timely provision of data is part of the primary objectives of any information system.

### *2.2 Internal control*

Programs and techniques of a commercial unit are designed to take care of assets, providing accurate and trustable information, enhancing efficiency of operations and encouraging staff to observe principles and managerial methods (Sajjadi & Tabatabaei Nejad, 2006). AISs is a necessary mechanism in crucial management decisions and control any organizations (Jensen, 1983 & Zimmerman, 1995). Internal control is the primary requirement of an organization for close supervision in operations (Simons, 1987). Avi and Sara (1995) contend that designing the system of software choice is compatible with control. They made this assessment as part of their objectives of their research. From the point of view of control, propriety of data security is the primary concern of

an organization (Abernethy etc., 2004). If applicable controls were not strong, the outputs of AISs would include management errors and this in turn would have a negative influence on the relationships of an organization with sellers, buyers and external parties. According to Sajjadi and Tabatabaei Nejad (2006), there are five internal control groups in computer systems as follows,

1. Control of primitive data,
2. Control methods of validity in input data to system,
3. controls of direct Input data to system,
4. Maintenance controls of files and processing of data,
5. Control of system outputs.

### *2.3 Production cycle*

Production cycle consists of continuous commercial activities and processing of data concerning production (Romney & Barrett, 2003). Accounting information system of a company plays a crucial role in production cycle. Timely and accurate information of cost accounting system (CAS) is essential for the following items:

1. Product mix,
2. Product pricing,
3. Resource allocation and planning,
4. Cost management.

Production cycle includes four major activities including product design, production programming, production operations and cost accounting. Although accountants deal more with cost accounting, they need clear knowledge of the processes and information of other activities of production cycle to gain certainty about capacity of AISs to provide necessary information concerning management decisions.

### *2.4. Product Design*

AISs play a vital role in product design because nearly 65% to 80 % of product costs in this step is associated with production operations. AISs play an active role in product design through showing impacts of various manners of design on production costs and profitability. This, in turn, can lead to increase in decision- making power of managers as well as long-term profitability of the firm.

### *2.5. Programming and Schedule of Production*

The primary objective of this phase of production is to design an efficient production program to take current orders and meet short-term demands without producing additional products. AIS classifies and reports information about the full expenditure of products and other cost components in line with methods of production programs implemented by firms and doing this may need some modifications in AISs to suit and be compatible with modern techniques of programming.

### *2.6. Production Operations*

Manufacturing sector utilize various methods of production, like mass production, production based on work order or timely production system, etc. All production systems need three conditions of production operations, raw materials, wage rates, machinery and other expenses, which have direct influence on AISs and for timely and trustable provision of data AISs must be employed.

### *2.7. Cost Accounting*

The last step of production cycle is cost accounting, which the following three objectives,

- Provision of data for programming, control and assessment of production.
- Provision of accurate data concerning End Cost of Goods for use in decisions related to blending of products and pricing.
- Provision of required data for determining End Cost of goods finished (ECGF) and Cost of Goods Sold (CGS).

### 3. Research hypotheses

According to the research problems and objective as well, the following hypotheses were postulated in the study:

1. AISs are compatible with product design in production cycle.
2. AISs are compatible with programming in production cycle.
3. AISs are compatible with production operations in production cycle.
4. AISs are compatible with cost accounting in production cycle.

### 4. Objectives and Research Approach

The method applied in this study is descriptive - survey method. In order to gain access to the realm of research, field method has been added. For the purpose of gathering required information, two types of information; primary and secondary in line with documents, books, papers, search engines and relevant sites have been gathered and utilized. We have also simultaneously employed techniques such as questionnaires and interviews in order to gather primary data of the research from statistical population. We have taken accidental samples along with sample size. In this study we have included manufacturing firms located in Zanjan-Iran, containing staff less than 10 people (small), 10 to 50 (Medium), 50 to 150 (Large), and more than 150 (Very Large) Showed (Table 1).

**Table 1**  
Descriptive of Human Resource Size

Firm Size	Sample in numbers	Frequency Percent
Less than 10	19	22.4
10 to 50	22	25.9
50 to 150	24	28.2
More than 150	20	23.5
Sum	858	100

In the deductive analysis, we have utilized one sample T test to compare and contrast the predicted and observable mean in order to decide which hypotheses to confirm and which to reject. If the mean observed as the result of the studied sample for each hypothesis compared to the predicted mean  $\frac{1+2+3+4+5}{5} = 3$  is  $\leq 3$ . We can confirm that frequency of the options very mach and mach in proportion to frequency of the options very little and little is considerably low. Thus, the researcher's hypothesis is confirmed. Then through the Kruscal-Wallis test is used to study the effects of work force on independent variables including product design, programming, production operations, and cost accounting, separately.

In this study, researchers follow two main objectives; first current AISs are compatible with activities of production cycle. Second in case of incompatibility, the effects of each independent variable on the variable of work force have been investigated. If the size of a firm changes, the information system of the firm that changed must be utilized.

### 5. Statistical Analysis

In the deductive analysis, we have utilized one sample T test to compare and contrast the predicted and observable mean in order to decide which hypotheses to confirm and which to reject. Then

through the Kruscal-Wallis test, the effects of work force on independent variables including product design, programming, production operations and cost accounting) have been investigated, separately.

In this section, research hypotheses have been studied through one sample T test. In this test, we have compared theoretical and practical mean. Theoretical mean is the median of allocated codes to options of every question, which equals to 3. If the observable mean (mean obtained from the studied sample for each hypothesis) is considerably bigger than the theoretical mean, we can accept that frequency of the options very mach and mach in proportion to frequency of the options very little and little is considerably low, thus the hypothesis is proved.

### 5.1. The first hypothesis

AIS of manufacturing firms are compatible with product design activity in production cycle. Hypotheses related to comparison of theoretical and practical mean are as follows,

$$\begin{cases} H_0: \mu \leq 3 & \text{Accept} \\ H_1: \mu > 3 & \text{Reject} \end{cases}$$

According to Table 2, P-value=0, the hypothesis  $H_0$  at the error level of 5% is rejected. That is the observable mean is more than 3 and since the practical mean (3.2924) is more than 3 (theoretical mean), thus it is concluded that the observable mean is considerably more than 3. In other words, at the error level of 5% the hypothesis is not accepted. Consequently, AISs are not compatible with product design activity in production cycle.

### 5.2. The second hypothesis

AIS of manufacturing firms are compatible with programming activity in production cycle. Hypotheses related to comparison of theoretical and practical mean are as follows,

$$\begin{cases} H_0: \mu \leq 3 & \text{Accept} \\ H_1: \mu > 3 & \text{Reject} \end{cases}$$

**Table 2**

Results of one sample T test (Test Value=3)

Hypothesis	N	Mean	Std. Deviation	t	df	P-value	Result
First Hypothesis	85	3.2924	.38617	6.982	84	.000	Reject
Second Hypothesis	85	3.3294	1.19869	2.534	84	.013	Reject
Third Hypothesis	85	3.1854	.54554	-3.420	84	.001	Reject
Fourth Hypothesis	85	2.9745	.59178	-.397	84	.692	Accept

Based on the results of Table 2, P-value = 0.013, the hypothesis  $H_0$  at the error level of 5% is rejected. That is the observable mean is more than 3 and since the practical mean (3.3294) is more than 3 (theoretical mean), thus it is concluded that the observable mean is considerably more than 3. In other words, at the error level of 5% the hypothesis is not accepted. Consequently, AISs are not compatible with programming activity in production cycle.

### 5.3. Test of Third hypothesis

AIS of manufacturing firms are compatible with activities of production operations in production cycle. Hypotheses related to comparison of theoretical and practical mean are as follows:

$$\begin{cases} H_0: \mu \leq 3 & \text{Accept} \\ H_1: \mu > 3 & \text{Reject} \end{cases}$$

Regarding Table 2, P-value = 0.001, the hypothesis  $H_0$  at the error level of 5% is rejected. That is the observable mean is more than 3 and since the practical mean (3.1854) is more than 3 (theoretical mean), thus it is concluded that the observable mean is considerably more than 3. In other words, at the error level of 5% the hypothesis is not accepted. Consequently, AISs are not compatible with activities of production operations in production cycle.

#### 5.4. Test of Forth hypothesis

AIS of manufacturing firms are compatible with activities of cost accounting in production cycle. Hypotheses related to comparison of theoretical and practical mean are as follows:

$$\begin{cases} H_0 : \mu \leq 3 & \text{Accept} \\ H_1 : \mu > 3 & \text{Reject} \end{cases}$$

According to Table 2, P-value = 0.098, the hypothesis  $H_0$  at the error level of 5% is accepted. That is the observable mean is more than or equals 3 and since the practical mean (2.9745) is less than 3 (theoretical mean), thus it is concluded that the observable mean is considerably less than 3. In other words, at the error level of 5% the hypothesis is proved. Consequently, AISs are compatible with activities of cost accounting.

#### 5.5. Kruscal-Wallis Test

To study the effects of work force working for the firm on independent variables of the research (product design, programming, production operations and cost accounting) Kruscal-Wallis test is employed.

$$\begin{cases} H_0 : \mu_1 = \mu_2 = \mu_3 = \mu_4 & \text{Accept} \\ H_1 : \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4 & \text{Reject} \end{cases}$$

**Table 3**

Independent Variable	Firm Size	Number Of Sample	Mean Ranking
Product Design	Small	19	33.61
	Medium	22	36.82
	Large	24	46.06
	Very Large	20	55.05
Production Programming	Small	19	43.53
	Medium	22	37.43
	Large	24	43.56
	Very Large	20	47.95
Production Operations	Small	19	43.66
	Medium	22	37.05
	Large	24	42.75
	Very Large	20	49.75
Cost Accounting	Small	19	53.34
	Medium	22	32.59
	Large	24	37.33
	Very Large	20	51.43

Table 4 shows both number and mean of each independent variable isolating the number of work force in the firm. Regarding the significant results obtained in Table 4, we can say that the number of work force in the firm has an impact on independent variables of product design and cost accounting but does not have any impact on variables of programming and production operations.

**Table 4**  
Result of Kruscal –Wallis Test

Independent Variable	Product Design	Production Programming	Production Operation	Cost Accounting
Chi-square	9.427	1.996	2.620	11.154
Df	3	3	3	3
Asymp. Sig.	0.024	0.573	0.454	0.011
Result	Difference is significant	Difference is not significant	Difference is not significant	Difference is significant

## 6. Results and Findings

This research produces the results of the survey obtained from active manufacturing firms in Zanjan-Iran based on firm size in order to investigate compatibility of AISs with activities of production operations. The results of T test in the research hypotheses show incompatibility of AISs with activities of product design, programming and production operations in production cycle. This incompatibility indicates that the firms are unprepared to accept modern costing systems like ABC, objective based costing (OBC) and other costing systems. The elimination of modern costing systems has led to weakness of the firms in producing real, trustable and timely information for decision-making. Thus, the manufacturing firms must make activities of production cycle compatible with AISs so as to be able to produce real, trustable and timely information in decision-making for managers and users.

Along with uniformity of the status of studied samples based on sample size through Kruscal-wallis Test, the results show uniformity of studied samples concerning activities of product design and AIS and lack of uniformity in the status of programming activities and production operations. Lack of uniformity in programming activities and production operations indicates that the firms are not prepared to accept modern costing systems. This shows importance of programming activities and production operations through compatibility of AISs in readiness of firms to accept modern costing systems.

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