

Integrative Management Information, Role Ambiguity and Managerial Performance: An Intervening Model

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ABSTRACT

Given the increasingly complexity and interdependence of managerial tasks, the role of integrative management accounting information (MAI) becomes very important for managerial performance. This study examines how integrative MAI influences performance, directly and indirectly, via role ambiguity. Using a sample of 108 managers working in manufacturing organizations derived from *The Business Who's Who of Australia* (2003), we found a positive and direct link between integrative MAI and managerial performance and an indirect link between these two variables through role ambiguity. Implications for the study's results are addressed as well as implications for some methodological issues relating to the measurement of MAI and managerial performance.

Key words: management accounting information, integrative information, role ambiguity, performance

INTRODUCTION

Contemporary work environments, characterized by hyper-competition, change and technological complexity, and concomitant cross-functional interdependent work arrangements, have created the need for new forms of management information to assist managers in decision making, planning and co-ordination. It has been acknowledged for some time that traditional financial information internal to the organization with a past orientation can no longer suffice within this context (Pierce and O'Dea, 2003; Mia and Chenhall, 1994; King, Lee, Piper and Whittaker, 1991). Responding to this challenge, researchers in the field of management accounting have explored the augmentation of management accounting systems (MASs) to include primarily external, non-financial, future

oriented information (referred to as broad scope information), and to a lesser extent, aggregated, timely and integrated information. A substantial part of this research has focussed on understanding contextual conditions for augmented (or sophisticated) MASs, (e.g., Chenhall and Morris, 1986; Abernethy and Guthrie, 1994; Chong and Chong, 1997; Bouwens and Abernethy, 2000). Essentially, this research demonstrates that managers experiencing uncertainty and/or interdependencies use (or find useful) more sophisticated management accounting information, such as broad scope information. While earlier studies focussed solely on contextual conditions for management accounting information (e.g., Chenhall and Morris, 1986), more recent studies have explored the interactive influence of contextual conditions and management accounting information on performance (e.g., Chong 1996). Very few studies, however, have attempted to understand *how* management accounting information leads to favourable performance outcomes. That is, while we are approaching an understanding of the contextual conditions for sophisticated MASs, management accounting researchers have not hitherto articulated the theoretical links to performance.

Against this background, our objective is to empirically examine the *direct* effect of the provision of integrative accounting information on managerial performance, as well as consider possible *indirect* effects between integrative accounting information and performance via role ambiguity. Integrative accounting information was specifically selected for inclusion in the research model because firstly, it has received comparatively less attention than broad scope information and secondly, integrative information offers specific coordinating qualities likely to be particularly beneficial in the interdependent, uncertain work environments of today, as outlined above. Research on role ambiguity within a MAS context is scant (Collins, 1982 and Marginson, 2006 are notable exceptions); however, there is considerable research on role ambiguity in the organization psychology literature with strong theoretical links to performance and information deficits (Tubre and Collins, 2000; Jackson

and Schuler, 1985; Kahn, Wolfe, Quinn and Snoek, 1964). Thus, role ambiguity, as an intervening construct, may enable us to understand how integrative management accounting information influences performance. Finally, this study also addresses an ongoing unresolved debated in MAS research, namely, ‘do we measure usefulness, or availability of information?’ (Gerdin, 2005; Gul, 1991). Certainly availability and usefulness of information are distinctly different constructs with implications for the (lack of) comparability of research results, as well as different practical implications for MAS design. We have developed an alternative method of accounting information measurement to address this ongoing issue.

THEORY DEVELOPMENT AND HYPOTHESES

Integrative Management Accounting Information and Managerial Performance

Integrative MAI is one dimension of accounting information that comprises a management accounting information system. More specifically, integrative MAI assists in the coordination between segments within a sub-unit and between sub-units (Chenhall and Morris, 1986). Integrative MAI includes information that pertains to the specification of activity targets which take into account the effects of interactions within and between organizational sub-units for which the manager is responsible, information concerning the impact that a manager’s decision will have on the organizational subunit including performance, and the impact that other managers’ decisions will have on the organizational subunit.

Previous empirical literature on the integrative MAI/performance relationship is scant. Prior research in this field has tended to favour the information dimension, broad scope. Yet other research attempts to explain MAI choices managers make – that is, MAI is the dependent variable and therefore a performance outcome variable is not included in the model. Two researchers who have included integrative MAI and performance in their respective models

are Gul (1991) and Chia (1995); unfortunately, in both these studies the specific relationship between integrative MAI and performance was not reported.

Theoretically, we argue that the availability of useful integrative information within a context of increasing complexity and interdependence of managerial tasks is likely to enhance managerial performance, particularly the planning, coordination and control tasks of managerial performance. Invoking Galbraith's (1973) information processing model, higher levels of uncertainty is a function of a widening information gap – a gap between information currently available and information required to make decisions. According to Galbraith (1973), an information gap can be addressed by, *inter alia*, increasing the information processing capacity of the organization's information system, such as the provision of more sophisticated management accounting information, which would include integrative accounting information. Against this background, integrative information clarifies intra and inter-unit cause/effect relationships by providing feedback to unit managers on how their actions and decisions effects other unit managers' actions and decisions, and visa versa. Integrative information can also play a coordinating role in large organizations that comprise several sub-units. Further, managerial performance (particularly planning and control) is enhanced with the provision of integrative information since it enables managers to better understand the different objectives pursued by separate sub-units and to make trade-offs among alternative ways to operate within the given set of sub-unit objectives (Chia, 1995; Bouwens and Abernethy, 2000). Thus we hypothesize that the provision of useful integrative MAI will have a positive effect on managerial performance.

H1: Integrative MAI and managerial performance have a significant, positive relationship.

Role Ambiguity and Managerial Performance

Role ambiguity occurs when the behaviours expected for the role are unclear or undefined. Role ambiguity is experienced when an employee (i) is uncertain or unclear about role expectations such as what actions or behaviours are required to fulfil the role, (ii) does not understand his/her duties and responsibilities, (iii) does not know the level of authority he/she possesses or (iv) how her/she is to be evaluated, and this may lead to behavioural consequences such as being indecisive and relying on trial and error learning in attempting to meet the organization's expectations (Pearce, 1981).

Role ambiguity has been associated with reduced individual and organizational performance (Hamner and Tosi, 1974; Chenhall and Brownell, 1988). According to Jackson and Schuler (1985), the negative relationship between role ambiguity and performance can be explained by research that focuses on cognitive and motivational processes. From a cognitive perspective, role ambiguity results in lower performance since there is a lack of information about appropriate job behaviours; whereas, from a motivational perspective, role ambiguity results in lower performance because role ambiguity weakens the links between effort-to-performance and performance-to-reward expectancies (Jackson and Schuler, 1985).

Empirical research addressing the role ambiguity/performance relationship is mixed with some researcher reporting a negative relationship while other researchers reporting no relationship. Tubre and Collins (2000) in their meta-analysis, however, concluded that role ambiguity is negatively related to performance. Further, within an accounting context, Fisher (2001) found that role ambiguity was significantly negatively related to auditor's job performance. This suggests hypothesis 2:

H2: Role ambiguity and managerial performance have a significant, negative relationship.

Integrative Management Accounting Information and Role Ambiguity

Recall, integrative management accounting information assists in the coordination between segments within a sub-unit and between sub-units (Chenhall and Morris, 1986). Integrative management accounting information includes the specification of activity targets which take into account the effects of interactions within and between organizational sub-units for which the manager is responsible, information concerning the impact that a manager's decision will have on his/her organizational subunit including performance and the impact that other managers' decisions will have on his/her organizational subunit. Further recall that role ambiguity occurs in the work environment when an employee lacks the necessary information for the effective performance of the given role (Kahn, Wolfe, Quinn and Snoek, 1964; Senatra, 1980). Fundamentally, role ambiguity is a condition in which information is not available or the information is not communicated (Schuler, 1975; King and King, 1990; Marginson, 2006). Thus, the provision of useful integrative management accounting information provides insight and clarity into the interactions and interdependencies that occur within an organization's sub-units, thereby reducing the role ambiguity experienced by managers. We expect, therefore a negative integrative/role ambiguity relationship as follows:

H3: Integrative MAI and role ambiguity have a significant, negative relationship.

Integrative MAI, Role Ambiguity and Managerial Performance

Notwithstanding the direct relationships outlined above, we also hypothesize an indirect path between integrative MAI and performance via role ambiguity. That is, we expect that the availability of useful integrative MAI will provide additional information about appropriate role behaviours for managers who work in increasingly complex and interdependent work environments, thereby reducing their role ambiguity. In turn, reduced role ambiguity is likely to be associated with enhanced performance because managers are clearer about effective role behaviours and are motivated due to a greater clarity in effort-to-performance expectancies. The intervening effect of role ambiguity in the relationship between integrative MAI and performance can be expressed as follows:

H4: There is a positive indirect relationship between integrative MAI and performance acting through role ambiguity.

RESEARCH METHOD

A potential sample of 588 managerial/supervisory personnel from 94 Australian organizations was identified from a population of 166,916 company decision makers and 40,361 business organisations included in the *The Business Who's Who of Australia* (2003) database. The criteria for inclusion in the sample selection were as follows: (1) the employers of the participants were designated as manufacturing organisations; (2) the manufacturing organisations must have at least 500 employees; (3) the participants were required to have supervisory or managerial responsibilities and (4) the participants were involved in any functional area within the organisation. We carefully selected our sample to include only middle and lower-level managers and supervisors, all top-level managers with either chief executive officer or director designation were excluded. We chose manufacturing organizations with more than 500 employees as this criterion would only include organizations sufficiently large enough to have a formalised MAS in place. Each participant was sent a questionnaire together with a covering letter explaining the purpose of the study and assuring confidentiality. A reply-paid envelope was included for the return of the completed questionnaire. A prize competition entry form and a separate reply-paid envelope for the prize competition entry form were also included in an attempt to increase the response rate. Of the 588 distributed questionnaires, 129 were returned, representing a response rate of 22%. The final sample consisted of 108 usable responses since 20 questionnaires were incomplete.

Variable Measurement

Integrative management accounting information. Integrative management accounting information was measured using an adapted measure of the Chenhall and Morris (1986)

instrument. A major change to the instrument was two versions of the instrument were included in the questionnaire. The first version of the instrument assessed information availability by asking managers to "...indicate the extent to which the following information is available to you in undertaking your work tasks and making decisions in your work unit" regardless of whether the information was useful or not. The second version of the instrument assessed information usefulness by asking managers to "...indicate the usefulness of the same information attributes...for the purpose of undertaking your work tasks", regardless of whether the information was available or not. The reason for the two versions of the instrument was to address the continuing usefulness/availability of MAI debate occurring within the management accounting system design literature (see Gerdin, 2005). Chenhall and Morris (1986) measured the "perceived usefulness" of management accounting system information, and the idea behind this measure was that information perceived as being useful it is more likely that it would be used (Gerdin, 2005). Gul (1991) argued that the Chenhall and Morris's (1986) conceptualisation of perceived usefulness of management accounting system information was inadequate, as perceived usefulness alone would not provide a direct linkage to managerial performance and that the availability of information would have a more direct impact on performance, the argument was that information that is useful to managers is not always available from the management accounting system. Therefore, to capture both sides of the argument, both availability and usefulness was measured in this study.

Integrative MAI was measured by multiplying the response to each of the three availability questions with the response to each of the three usefulness questions to achieve a composite index of "availability/usefulness" for each item in the integrative management accounting instrument. The three "availability/usefulness" indices were summed together to calculate a weighted measure of integrative management accounting information. A principal components factor analysis of Chenhall and Morris's (1986) integrative MAI instrument was performed. Factors with eigenvalues of >1 were retained and the factor solution was rotated

using the varimax orthogonal method. One factor emerged. The Cronbach alpha was .83 indicating satisfactory internal reliability for the integrative MAI scale.

Role Ambiguity. Role ambiguity was measured using six items from the instrument developed by Rizzo, House and Lirtzman (1970) using a seven-point Likert scale. This measure has been used in accounting and particularly in behavioural auditing studies (e.g. Chenhall and Brownell, 1988; Bamber, Snowball and Tubbs, 1989; Gregson, Wendell and Aono, 1994; Fogarty, Singh, Rhoads and Moore, 2000; Fisher, 2001; Viator, 2001; Almer and Kaplan, 2002). There has been considerable debate in the literature concerning the Rizzo *et. al.* role ambiguity scale, however the Rizzo *et. al.* measure has been used extensively and has shown to exhibit acceptable psychometric properties (see Jackson and Schuler, 1985; Smith, Tisak and Schmieder, 1993; Tubre and Collins, 2000). A principal components factor analysis of Rizzo *et. al.*'s (1970) role ambiguity instrument was performed. Factors with eigenvalues of >1 were retained and the factor solution was rotated using the varimax orthogonal method. One factor emerged. The Cronbach alpha was .84 indicating satisfactory internal reliability for the role ambiguity scale.

Managerial performance. The instrument used to measure performance in this study is a modified self-rated performance evaluation measure developed by Mahoney, Jerdee and Carroll (1963). A self-rated measure was used due to the promise of respondent confidentiality. Respondents were asked to rate their own performance on eight dimensions of performance identified by Mahoney; planning, investigating, coordinating, evaluating, supervising, staffing, negotiating and representing and the ninth item was an overall performance rating. A nine point Likert scale ranging from unsatisfactory to outstanding with a modification to the Mahoney *et. al.* measure where respondents could select a "not applicable" response. This "not applicable" response was included because there may be a shift within organisations towards specialisation of some of these managerial dimensions

since the original Mahoney instrument was published. For example, human resource management (staffing), supply chain management and industrial relations (negotiating) and corporate communications/public relations (representing). The percentage of the “not applicable” response for the managerial performance components of staffing was 25%, negotiating was 32% and 22% for representing. The other five dimensions of managerial performance, the percentage of “not applicable” responses was less than 10%. Due to this “not applicable” response rate for three dimensions, these three dimensions were removed from the managerial performance measure. Managerial performance was measured by adding the responses for the five remaining dimensions (planning, investigating, coordinating, evaluating and supervising) together and then dividing by the number of applicable responses received from each individual manager to obtain a simple average overall indicator of managerial performance.

Control variable

Task interdependence. In the study design, an important control variable is interdependence (or at least some measure of uncertainty). We needed to ensure that the managers in the sample faced high levels of interdependencies, thus creating a need for sophisticated MAI (Chenhall and Morris, 1986; Bouwens and Abernethy, 2000). Four items of the Dean and Snell (1991) seven-item instrument were used to evaluate task interdependence. This instrument conceptualized interdependence in terms of collaboration. That is tasks are interdependent were the people who are performing them must collaborate with others to complete their tasks (Mohr, 1971; Van de Ven, Delbrecq and Koenig, 1976). Respondents were asked to indicate how often collaboration occurs when completing work tasks on a seven-point Likert-type scale, varying from (1) rarely to (7) frequently. A principal components factor analysis was performed on the instrument and factors with eigenvalues of >1 were retained and the factor solution was rotated using the varimax orthogonal method. One factor emerged. The Cronbach alpha obtained was .74 indicating satisfactory internal

reliability for the role ambiguity scale. The respondents experienced very high levels of task interdependence with a mean overall score of 5.9 out of a maximum 7.

RESULTS

A path model was used to explore the relations between integrative management accounting information, role ambiguity and managerial performance. The path model is presented diagrammatically in Figure 1. The path coefficients in the model are denoted by p_{21} , p_{31} , and p_{32} . The path coefficients are computed as follows. The path p_{21} is the zero-order correlation r_{12} (between integrative management accounting information and role ambiguity) as it is assumed for the purposes of this study that the provision of useful integrative management accounting information (X_1) is the only antecedent of role ambiguity (X_2). The paths p_{31} and p_{32} are the standardised beta coefficients estimated when regressing managerial performance (X_3) on integrative management accounting information (X_1) and role ambiguity (X_2) contemporaneously.

Figure 1: Theoretical Model

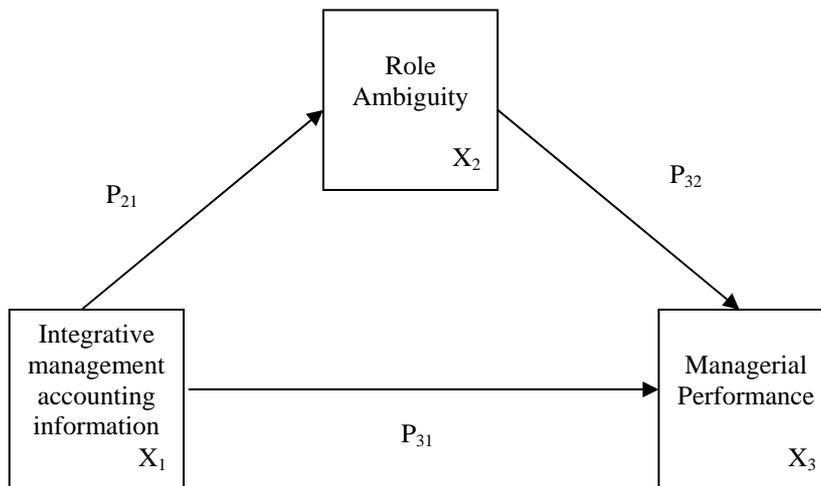


Table 2. Descriptive statistics on measures used

Variables	Mean	Standard	Theoretical range		Actual range	
			Min	Max	Min	Max

	Deviation					
Integrative MAI	84.61	29.4	6	147	8	147
Role ambiguity	17.50	5.88	6	42	6	37
Managerial performance	6.83	0.87	1	9	3	9

TABLE 3. Correlation Matrix

	Integrative MAI	Role Ambiguity	Managerial Performance
Integrative MAI	1.00		
Role ambiguity	-.441*	1.00	
Managerial performance	.331*	-.292*	1.00

* significant at 0.01 level

The descriptive statistics and the zero-order correlation coefficients for all the variables are presented in Tables 2 and 3 respectively. There is a significant, negative relationship between integrative MAI and role ambiguity as hypothesised. Within this path model, this zero-order correlation is the path coefficient, p_{12} linking integrative MAI and role ambiguity. The results of the standardised regressions used to generate paths p_{31} (between integrative MAI and performance) and p_{32} (between role ambiguity and performance) are detailed in Table 4.

TABLE 4. Path analysis results

Dependent variable	Independent Variables	Associated Hypothesis	Path Coefficient	t-value	p-value (one-tail)	R ²
Role Ambiguity	Integrative MAI	H1	-.441 (p_{21})	-5.087	.001	.195
Managerial performance	Integrative MAI	H2	.251 (p_{31})	2.498	.007	.120
	Role Ambiguity	H3	-.181 (p_{32})	-1.796	.037	

Table 5 provides the decomposition of the association between integrative MAI information and managerial performance. The zero-order effect ($r_{13} = .331$) decomposes into a positive direct effect of .251 and small, positive indirect effect of .08. The direct effect of provision of useful integrative MAI on managerial performance is significant ($p < .01$). Table 5 also provides the decomposition of the linkage between role ambiguity and managerial performance. The zero-order effect ($r_{23} = -.292$) decomposes into a negative direct effect of -

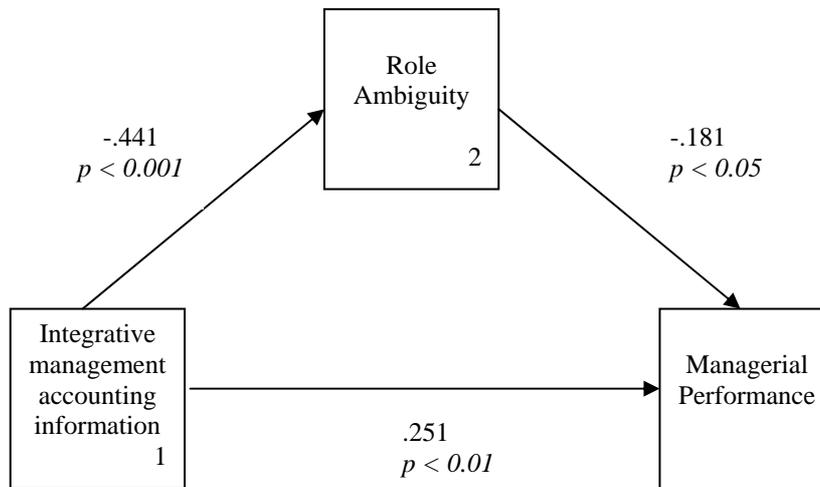
.181 and spurious effect of -.111. The direct effect of role ambiguity is significant ($p < .05$).

Figure 2 details these results diagrammatically.

TABLE 5. Decomposition of direct and indirect effects

Combination of variables	Observed Correlation	=	Direct Effect	+	Indirect Effect	+	Spurious Effect
Integrative MAI/Role ambiguity	-.441		-.441				
Integrative MAI/Managerial performance	.331		.251		.0800		
Role ambiguity/Managerial performance	-.292		-.181				-.111

Figure 2. Path Coefficients



DISCUSSION AND CONCLUSIONS

At a broad level, the results of this study add to the extant literature on the effective design of management accounting information systems; more specifically the results add to our understanding of the relationship between integrative MAI and managerial performance. The findings indicate that integrative MAI directly and positively affects managerial performance, and at the same time, there is an indirect link between integrative MAI and performance via role ambiguity. That is, the availability of useful integrative MAI reduces role ambiguity because managers have access to additional information which clarifies the effective role behaviours necessary for the job, which in turn favourably affects performance.

The direct positive link between integrative MAI and managerial performance has not hitherto been examined within the literature examining effectiveness of management accounting systems. The finding of such a link is important for the design of effective MAIs such that the inclusion of useful integrative information is an important component for managerial performance. In a context of increasing competition and downsizing, and the concomitant expansion of management roles and increasing work complexity, the provision of integrative

information would seem even more important as a means to affect managerial performance, particularly with respect to planning, control and coordination.

The finding of a direct negative relationship between role ambiguity and performance is consistent with previous literature (Tubre and Collins, 2000). The reduction in role ambiguity provides cognitive and motivational benefits to managers enhancing their performance. The integrative MAI/role ambiguity relationship has not been previously examined however, we found a direct negative relationship. We theorized that the availability of useful integrative MAI provides more information about the managers' job such that he/she has a clearer understanding of how to effectively fulfil job requirements.

This study also addressed methodological issues with respect to the measurement of management accounting information and managerial performance. Firstly, in the measurement of MAI there has been debate in the literature regarding the appropriateness of asking managers to rate the "availability" or "usefulness" of the management information. We found that the means for perceived "usefulness" were higher than the means for perceived availability, which implies that availability and usefulness are not equivalent. We addressed this issue by calculating a weighted preference for information (integrative) that comprised both elements of usefulness and availability. In other words it is a measure that assesses managers' perceived usefulness of management information but also considers the extent to which this information is available. The second methodological issue related to the measurement of managerial performance with the use of the Mahoney et al. (1963) measure. A number of limitations have been raised with respect to this measure, particularly the relevance of the managerial functions comprising the instrument (planning, controlling, representing etc.). To overcome this issue we provided an additional column along side the managerial function items to allow respondents the choice of selecting "not applicable" for each function. Indeed managers' responses revealed that functions such as staffing,

negotiating and representing were not applicable, possibly due to specialized departments in areas such as human resources and corporate communications. Therefore future research using the Mahoney measure should consider this modification to ensure managerial performance comprises the relevant functions.

As with most research, the study is subject to a number of potential limitations. Our sample was carefully selected to include middle managers from large manufacturing organizations only, therefore, our results may not be generalizable to smaller firms, service firms or employees. Self-rating scales used in this study have been criticized, particularly with respect to performance, due a higher leniency error and a restricted range in the score (Thornton, 1968). Further we examined only one component of MAI (integration) – other management information components (e.g., broad scope) may also affect managerial performance through role ambiguity. Finally, given the nature of the research model and methods we are unable to assess definitively the causality between the variables, particularly the causality between MAS and role ambiguity. Future research could employ different research methods to systematically investigate the causal relationships proposed in our study.

Notwithstanding these potential limitations, this study does add to the existing literature on management accounting information system design, as well as measurement issues surrounding MAI and managerial performance. Further from a practical viewpoint, the results of this study may assist designers of MAI systems to understand the importance of integrative information to managerial performance, particularly in the more complex work environment of today.

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