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## The British Accounting Review

journal homepage: [www.elsevier.com/locate/bar](http://www.elsevier.com/locate/bar)



# Activity-based innovations in the UK manufacturing sector: Extent, adoption process patterns and contingency factors



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### ARTICLE INFO

#### Article history:

Received 5 September 2013

Received in revised form 9 December 2014

Accepted 27 March 2015

Available online 11 April 2015

#### Keywords:

Activity-based innovations

ABI

Innovation attributes

Management accounting innovations

### ABSTRACT

This study defines Activity Based Innovations (ABI) as 'any management accounting practice that uses the concept of 'activities' as its hard core'. Based on this definition, this study investigates the extent of ABI adoption in UK manufacturing business units, explores the adoption process patterns, and examines the influence of nine factors on ABI initiation and adoption; and five factors on ABI extent of use. These factors relate to the perceived innovation attributes, organisational factors and the perceived environmental uncertainty. Data were collected by mail survey questionnaire of a random sample of business units, with questionnaire design and distribution based on Dillman's Tailored Design Method. Analysis indicates that 32% of respondents are serious ABI users. This is higher than previous UK surveys and could reflect the wide definition used in this survey, or, more likely, increasing take-up of ABI. The study also reveals that, based on a wide definition of ABI together with detailed analysis of stages of implementation, almost 72% of the business units sampled have had experience or interest in ABI and we therefore conclude that ABI can now be regarded as mainstream management accounting practice. Moreover, this study reveals that a large group of respondents adopted non-unitary or ad hoc adoption process patterns not reported in previous literature. Significantly, in 11% of cases ABI adoption was mandated on business units. Multivariate analysis reveals that top management support and level of overhead were associated with ABI initiation and adoption while, at the initiation stage, the ABI attributes, relative advantage and cost were also significant. The extent of ABI use was associated with top management support and an ABI champion.

This is the first study that investigates activity-based innovations as a set of inter-related techniques. Its results show that the adoption process could follow different patterns and highlight the importance of including innovation attributes in comprehensive contingency studies. Furthermore, it emphasises the importance of controlling for forced adoption cases, the organisational variables of top management support and innovation champion, and any innovation-specific contextual factors (such as level of overhead) in management accounting innovation studies.

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## 1. Introduction

Almost three decades after introduction, the extent of activity-based innovations (ABI) in mainstream management accounting practice is not clear and the contingencies affecting adoption have not been conclusively determined (Baird, Harrison, & Reeve, 2004; Brown, Booth, & Giacobbe, 2004; Zawawi & Hoque, 2010), and studies in the field remain rare and inconclusive (Ax & Bjørnenak, 2007; Zawawi & Hoque, 2010). This research addresses these issues by drawing on the managerial innovation and activity-based literature to investigate adoption and implementation of activity-based innovations.

Prior ABI research has been limited in four ways. *First* it has concentrated on a single activity-based innovation, usually activity-based costing and, as noted by Jones and Dugdale (2002), most innovation studies have, implicitly or explicitly, investigated the early, “first wave”, version of ABC as a full costing system. Therefore other theoretical and potential variants of ABI that could be developed in practice are largely overlooked in prior research. *Second*, early surveys did not provide a clear definition of the studied innovation and terms could therefore be misinterpreted (Brown et al., 2004; Gosselein, 2007). *Third*, contingency analysis has often omitted the attributes of the innovation itself as influencing factors. *Fourth*, there has been lack of consensus on the definition of the term ‘adoption’ (Brierley, 2011).

To address the first two points we follow the recommendations of innovation researchers,<sup>1</sup> by paying particular attention to the nature of ABI and the definition of this class of innovations. Acknowledging the multidimensionality and ambiguity of managerial innovations in general and ABI in particular, we define ABI as ‘any management accounting practice that uses the concept of ‘activities’ as its hard core’. We focus on activity-based innovations rather than a single practice and view ABI as a set of interrelated practices that share a hard core, the “activity concept”, which can be adapted and used for different management accounting functions. Wolfe (1994) stressed the need for careful examination of the studied innovations in order to provide clear definitions that reflect their complex nature, and this is particularly important when studying managerial practice-defined innovations due to their high levels of ambiguity (Luft & Shields, 2003). By doing so, we also respond to the call by management accounting scholars for a better, up-to-date identification of management accounting constructs in contingency research (e.g. Baird et al., 2004; Bisbe, Batista-Foguet, & Chenhall, 2007; Chenhall, 2003, 2007; Luft & Shields, 2003; Otley, 1980; Otley & Fakiolas, 2000).

To address the third point, contingency variables, we draw on the innovation literature to identify factors that facilitate or hinder adoption and implementation of innovations. Factors are broadly classified as innovation attributes, adopter attributes and environmental conditions (Askarany, 2005; Rogers, 2003) and prior innovation and management accounting research has emphasised adopter attributes (structure, culture, strategy etc.) and environmental conditions (environmental uncertainty, competition, etc.) (Chenhall, 2007). Relatively few studies have focused on innovation attributes (e.g. relative advantage, cost, compatibility, image, result demonstrability and trialability) (Askarany, Smith, & Yazdifar, 2007; Damanpour & Schneider, 2009). However, Rogers (2003) highlights the importance of innovation attributes on innovation diffusion, typically explaining between 49% and 87% of the variance in an innovation's adoption rate. This study includes contingency variables relating to adopters, environment and the innovation itself.

To address the fourth point, definition of adoption, we synthesised and adapted a generic stage model of Management Accounting Innovations' (MAI) adoption to explore the pattern of adoption processes and identify the specific innovation stages/phases upon which the investigation focuses.

The research objectives can be summarised as follows:

- a) To provide a definition of ABI that encompasses the ABI set of management innovations as a basis for examining the extent of adoption of activity-based innovations.
- b) To explore ABI adoption process patterns in the UK manufacturing sector.
- c) To investigate whether perceived innovation attributes (specifically, relative advantage, cost, compatibility and trialability) are associated with the initiation and adoption of ABIs.
- d) To investigate whether organisational and environmental factors (specifically, top management support, champion support, size, level of overheads, product complexity and diversity and perceived environment uncertainty) are associated with the initiation, adoption and extent of use of ABI.

Therefore, this study contributes to management accounting literature primarily by specifying the concept of ABI, developing hypotheses about the factors influencing ABI initiation, adoption and extent of use, and testing these hypotheses with survey data collected from manufacturing companies in the UK. The research updates the literature on the adoption rates of an important set of MAIs, adds to our understanding of the influence of innovation attributes, and stresses the importance of organisational and innovation-specific contextual variables on the initiation and adoption of MAIs. The

<sup>1</sup> Innovation researchers use the terms innovation and invention interchangeably to describe the process of “innovating” (Gopalakrishnan & Damanpour, 1994; Osborne, 1998). In this regard, Damanpour and Wischnevsky (2006) distinguish between innovation-generating and innovation-adopting organisations and emphasise the importance of taking into account in any innovation research “the substantive differences between both types of organisation and the innovation processes in which they primarily engage” (Damanpour & Wischnevsky, 2006, p. 288). In this study we adopt the view that invention is about generating or discovering new ideas whereas innovation is about their adoption/application (Damanpour & Wischnevsky, 2006; Osborne, 1998).

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