

# DEVELOPING A TAXONOMY FOR THE UNDERSTANDING OF BUSINESS AND IT ALIGNMENT PARADIGMS AND TOOLS

## Abstract

*The alignment of information technology with business objectives tends to be a managerial priority in modern organisations. Thus, practitioners and researchers have proposed different approaches to assess this relationship, some following similar approaches whilst others proposing different ones. The variety of approaches proposed, however, has created confusion about the applicability and context in which these approaches can be used. Thus, aiming to tackle this challenge, this paper proposes a taxonomy that organises and compares studies of alignment assessment in terms of their theoretical constructors and their practical use. The taxonomy is build around two research sources: a) a review of the literature of alignment and b) a framework for comparing IS methodologies. The structure of the taxonomy permits insights into studies by means of six theoretical (objective, nature of strategy, paradigm, dimension, type of measurement, model) and six practical constructors (audience, scope, output, techniques, product, target). The taxonomy is then applied to six assessment studies. The benchmarking analysis of these helped to identify their theoretical basis and its practical use, and confirms the need for more practical mechanisms to assess alignment. Additionally, it becomes apparent that process perspectives and social understanding of alignment are the two main paradigms for alignment.*

*Keywords: strategic alignment, alignment assessment, IS planning*

# 1 INTRODUCTION

Many organisations realise that aligning information technology and business objectives, commonly referred to as alignment, is a managerial priority for solving organisational and business challenges (Ives Mandviwalla, 2004; Luftman, 2000; Tallon & Kraemer, 2003). The competitiveness of the market has produced organisations to look for a better way of understanding how to implement IT projects that boost their business strategies (Weill & Broadbent, 1998). Despite the fact that this area of research increases in relevance researchers and practitioners have not reached an agreement on the different ways to approach this challenge. This disagreement can be seen by the wide variety of studies that have emerged by proposing alternative approaches to research alignment. These commonly presume a wide debate to answer underlying questions such as *how can organisations achieve alignment?* and *how can organisations assessed their alignment?*. In the literature, research into alignment has been covered as a complete roundtrip process which involves three indistinct stages: assessing, achieving, and maintaining alignment (Luftman, 2000; Avison, 2004). Most research, though, does not identify any differences away from these stages even though each one might contribute independently to the field. As a consequence, some studies do not specifically advocate an adequate mean of measurement, whilst this is considered one of the steps towards achieving alignment. The different views make the comparison of insights more complex if considered that an alignment approach should satisfy the organisational context by ad-hoc measures (Zee, 2001). Today, few studies exist which collate current studies of alignment assessments by using mechanisms of comparison. This lack of research suggests that practitioners and researchers not only struggle to identify these studies but also point towards a laborious selective process for the most valuable approach to fulfil individual interests. There are no convincing mechanisms for evaluating the type of assessments that more adequately satisfy specific organisational needs. This process normally depends on the judgement of practitioners and researchers. In addition, the literature fails to compare studies taking into account their philosophical paradigms, which may permit benchmarking them and, eventually, expose their capabilities. This paper aims to contribute to the IT and business alignment process by clarifying alignment assessments through the content of their underlying constructors (the authors refer as constructors to the theoretical and empirical components involved in alignment assessments). In doing so, a taxonomy for current alignment assessments is proposed to benchmark these studies. The proposed taxonomy structure has theoretical and practical capabilities to support comparative mechanisms of analysis. Insights into alignment assessments are achieved by means of six theoretical and six practical constructors.

To guide the reader, the rest of the paper is organized as follows: the next section presents an overview of underlying constructors of alignment. This is followed by an explanation of two research sources for the development of the taxonomy structure. Then, the taxonomy structure is described and tested by using six studies. Finally, the findings are summarized in the conclusion together with limitations of this research and recommendations for further research.

## 2 OVERVIEW OF UNDERLYING CONSTRUCTORS OF ALIGNMENT

Alignment is a phenomenon that focuses on the complexity of organisational relationships given by the integration of IT and business objectives (Weill & Broadbent, 1988; Henderson & Venkatraman, 1999; Ciborra, 1997; Smaczny, 2001). In most cases, this relationship has been subject to different interpretations and according to the context behind the particular research attained. This research recognises that alignment research might be advanced by exposing such different interpretations. For instance, many alignment studies have exposed their differences against others by establishing their own boundaries. By reviewing some of the most cited articles in the alignment literature it became

apparent that some of these interpretations have been indicated. For instance, Chan et al. (1998) use Mintzberg (1998) to classify common understandings of organisational information systems (IS) strategies in order to suggest which strategy shapes their own research. The discussion is centred on two definitions: a) intended strategy, defined as not current, but the formal strategy susceptible to support future or past strategy; and b) realised strategy which reflects current and undertaken strategy. Reich and Benbasat (1996) also recognise alternative interpretations but they are focused on dimensions of alignment. They argue that alignment research should consider the difference between social and intellectual dimensions. The social dimension is “the content of information technology and business plans that are internally consistent and externally valid” (Reich and Benbasat, 1996 p.55) and intellectual dimension occurs when “the information systems and business executives understand each others objectives and plans” (Reich and Benbasat, 1996 p.55). In a more recent study, Reich and Benbasat (2000) extend the scope of social dimension by including the influence of four factors (*shared domain knowledge between business and IT executives, IT implementation success, communication between business and IT executives, communication between business and IT planning process*) and suggesting two paradigms as a consequence of the outcome of achieving alignment. These paradigms imply that the output of implementing alignment can be understood by either considering a “state” or a “process”. A state view involves alignment as a fixed output and the effect of itself. A process view is centred on intangible but planned activities which are performed dynamically through the roundtrip process of achieving alignment. Hale and Cragg (1996) propose a new instrument to assess alignment in small organisations based on the STROBE instrument developed by Venkatraman (1989) and the STROIS instrument developed by Chan (1992). To argue how these instruments could work simultaneously, they examine two ways of measuring alignment: a matching measure based on the difference between two measures, and a moderation measure which reflects synergy between two different measures. To calculate the alignment degree, the selected measure gives an interpretation of the difference between the scores of two items, which consequently represents the IS-business strategy integration.

STUDY	UNDERLYING CONSTRUCTOR	DESCRIPTION
CHAN ET AL. (1998)	Types of strategy evaluated	<b>Intended strategy:</b> no current, but formal strategy susceptible to support future or past strategy
		<b>Realised strategy:</b> reflects current and undertaken strategy
REICH & BENBASAT (1996)	Alignment dimensions	<b>Intellectual dimension:</b> focuses on content of planning approaches (methods and techniques). This dimension evaluates the content of IT and business plans if they are internally consistent and externally valid (Reich and Benbasat, 1996)
		<b>Social dimension:</b> focuses on people or factors involved in creating alignment. This dimension includes mutual understanding and commitment to the business and IT mission, objectives and plans (Reich and Benbasat, 2000)
REICH & BENBASAT (2000)	Alignment paradigms	<b>Process perspective:</b> focuses on the integration of IT and business as a process
		<b>State perspective:</b> focuses on the integration of IT and business as cross-sectional data and analyses states of such integration
HALE & CRAGG (1996)	Types of interpretations to measure alignment	<b>Matching measure:</b> based on the difference between two measures (Hale and Cragg, 1996)
		<b>Moderation measure:</b> reflects a synergy between two measures (Hale and Cragg, 1996)

Table 1 Review of underlying constructors of alignment

The literature suggests that alignment approaches have been demarked by alternative interpretations to describe their underlying constructors. Types of strategy evaluated (Chan et al., 1998), alignment dimensions (Reich & Benbasat, 1996), alignment paradigms (Reich and Benbasat, 2000), and alternative interpretations for measuring alignment (Hale & Cragg, 1996) have been discussed as key references to confine the scope of alignment assessments (see table 1). These interpretations not only clarify the foundation behind current alignment assessments but also provide insights into the research diversity of alignment. Moreover, these interpretations allow comparing mechanisms if they are taken reference to compare other studies. To enable such mechanisms in this research, the research gap is tackled by means of proposing a classification scheme which could be used as a reference to compare underlying constructors of alignment assessments.

### **3 METHODOLOGY OF THE TAXONOMY DEVELOPMENT**

Even though there are various classification schemes in the literature, a taxonomy was chosen for this research as it offers comparative advantages and contributes towards new research (Carper & Snizek 1980; Mezzich & Salomon, 1980; Mckelvey, 1982). The proposed taxonomy relates to “a scheme that partitions a body of knowledge and defines the relationships among the pieces. It issues for classifying and understanding the body knowledge” (IEEE, 1986). For this research, the body of knowledge was provided by collecting the data of different studies available in the literature, then generalising their concepts. Each selected study became a source of theoretical and practical data to be filled out into the taxonomy structure. There were no preconceived ideas regarding the intended structure. The first step was concentrated to develop the taxonomy structure based on elements able to characterise alignment assessments. Two sources of research were undertaken to define the taxonomy structure: *investigating IS comparison frameworks* and *evaluating common and underlying constructors of alignment assessments in the literature*.

#### **3.1 First research source for the taxonomy development: reviewing common constructors in the literature of alignment assessments**

This research source focused on defining constructors for the taxonomy structure by means of reviewing literature of alignment. The design of the taxonomy began empirically by finding common constructors within current alignment assessments. In doing so, a selection process was performed in the current literature to identify representative articles concerning alignment assessments. E-resources were used as the primary means to carry out such selection. Initially, studies focused on alignment were searched. The *web of science*, part of “*ISI web of knowledge service for UK education*“, and its associated database “*science citation index expanded*” provided the searching resources. This database indexes 5900 major journals across 150 scientific disciplines (ISIKnowledge, 2006) and permits a review of wider selection of databases. The database was used during the first two weeks of July 2006 to compile a collection of relevant literature whose title or abstract contains the keyword “strategic alignment”. Fifty-three articles were found and then ranked according their research impact (the number of times a study has been cited). These articles were also categorised according a criteria which included three objectives: a) propose tools or instruments of assessment, b) implement empirically their instruments or tools and c) hold relevant keywords such as “measure”, “measurement”, “measuring”, “assessing” or “assessment” in their abstract or title. After the revision, a group of thirty-one articles was compiled from which their references and citations allowed drill down other relevant articles. Therefore, new articles were added to the group according to whether their keywords in abstracts and titles included “alignment”, “strategic information systems planning” or “information systems planning”, and their impact would agree with the aforementioned criteria. Finally, articles were classified into two groups according their objective(s). Firstly, a group that include studies that focus on alignment to support its relevance, the impact of IT on business performance, and its relation with financial benefits or its business IT value. Secondly, a second group with studies that helps on understanding the alignment phenomena, and measures

alignment to help organisations to improve their current situation; see table 2 for the figures of each group. Finally, nine articles with assessing objectives were compiled to constitute the first source of the taxonomy development. This group was the bases to identify such constructors for the taxonomy structure.

GROUP	OBJECTIVE	NUMBER
Relevance, impact and benefit of alignment	Focus on alignment to support its relevance, the impact of IT on business performance, and its relation with financial benefits or its business IT value	22
Measure alignment to improve organisations	Help on understanding the alignment phenomena, and measures alignment to help organisations to improve their current situation	9
<b>TOTAL</b>		<b>31</b>

Table 2 Review of underlying components of alignment

### 3.2 Second research source for the taxonomy development: selecting a comparison framework

The second research source was concentrated on investigating a comparison framework for current alignment assessments. Since developing successful information systems has been closely related to the use and implementation of methodologies (Avison & Fitzgerald, 2006; Olle, 1991; Tagg, 1983) and methodological approaches have been related to justify current studies of alignment, research activities were dedicated to searching a framework with comparing capabilities for IS methodologies.

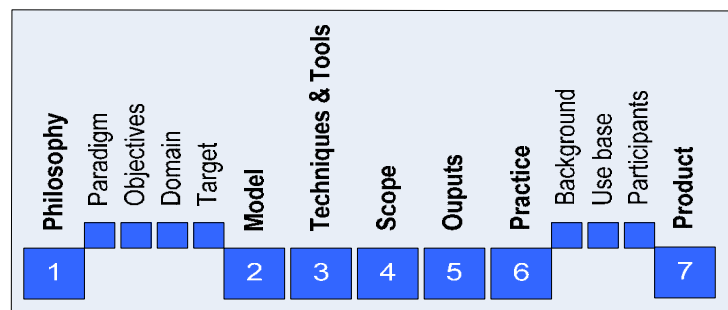


Figure 1. Original framework for comparing IS methodologies by Avison & Fitzgerald (2006)

According to Avison & Fitzgerald (2006), there are three main categories of rationale that organisations and individuals have used to justify the adoption of a particular methodology. They state that the aim of a methodology should be oriented to develop a better end product, a better development process, and a standardised process. In addition, they have been pointed out that IS methodologies should include a philosophical view, because methodologies intrinsically have applicability limitations as a consequence of those assumptions made by their own authors. The limitations of current IS methodologies mark an additional issue when decision-makers start a selecting process for a methodology that should fit their individual requirements. This process normally might include tailoring activities since small number of methodologies can satisfy ideally all expected requirements. By considering this, principles to implement alignment assessments or IS methodologies share similar rationales. The evaluation process as well as the elements involved in alignment assessments or methodologies hold similarities that might be exposed by using comparison techniques. The

framework provided by Avison and Fitzgerald (2006) proposes seven basic elements of comparison (see figure 1) to benchmark underlying elements of IS methodologies. As main advantage, this framework allows to remove any element according to the researching needs. Moreover, this framework offered theoretical and practical comparing capabilities that also can be applied to studies. This framework was selected as the second development resource for the taxonomy but adapted to the characteristics of alignment assessments.

#### 4 THE TAXONOMY STRUCTURE

The taxonomy structure was visualised with theoretical and practical capabilities. Avison & Fitzgerald (2006) suggest these reasons for comparing IS methodologies but regarding studies of alignment assessments face practical considerations. Most alignment assessments have been envisaged by using strong theoretical background, but not many advocating practical capabilities (Avison et al. 2004). For this research it was a criterion to include and evaluate both aspects. The taxonomy includes two substructures; a theoretical substructure with constructors concerning the background behind the study and a practical substructure with constructors concerning the practicability of the study. The theoretical substructure identifies six constructors (*aim objective, nature of strategy, paradigm, dimension, type of measurement approach & background model*). Four constructors, *nature of strategy, paradigm, dimension* and *type of measurement*, were included into this substructure as a result of the first research source of development. In addition, elements such as *objective* and *model* were taken from the framework for comparing IS methodologies proposed by Avison & Fitzgerald (2006). The constructor *domain* was discarded from the taxonomy since its definition details areas of concern but alignment research commonly envisages the entire organisation instead of specific business units or departments. The practical substructure includes other six constructors (*practice/audience, scope, output, technique, product* and *target*). These six elements were taken from the Avison & Fitzgerald (2006)'s framework and included into the practical group as result of the second source of construction. A detailed description of each theoretical and practical constructor is itemised in table 3 and table 4. Each suggested constructor will guide into the content of underlying constructors involved in alignment assessment. It is expected that constructors within a study will help the process of understanding a study as well as provide comparing mechanisms against others. The description of each constructor pretends to be a guideline for researchers and practitioners when they are planning a project of alignment assessment.

THEORETICAL CONSTRUCTORS	OBJECTIVE DESCRIPTION
Aim objective	Delimits boundaries of the area of concern.
Nature of strategy	Indicates what type of strategy is being used for the study, these are either "pretend" or "intended" strategies
Paradigm	Depicts the way of thinking view when alignment is implemented, considers either "outcome" or "process" views
Dimension	Considers two dimensions: "social dimension" attains the level of mutual understanding of alignment and "intellectual dimension" focuses on the content of plans
Type of measurement approach	Shows the alternatives undertaken to understand how alignment is measure, these are either "matching" and "moderation" types of measurement
Background model	Includes the representation & abstraction used for the basis of the study
<i>Table 3 Review of theoretical underlying components of alignment</i>	

PRACTICAL CONSTRUCTORS	DESCRIPTION
Practice/audience	Indicates who does or executes the assessment implementation
Scope	Indicates the study's scope by giving individual or combination of either "assessing", "maintaining" or "achieving" objectives
Output (conceptual deliverable)	Indicates what type of output the assessment produces in terms of its deliverables
Technique of measurement	Depicts those techniques used to carry on the alignment measurement
Product	Includes the final and practical element produced by the assessment
Target (limitations)	Evaluates the applicability of the study by including its limitations
<i>Table 4 Review of practical underlying components of alignment</i>	

## 5 ANALYSIS OF RESULTS

Having defined the taxonomy structure, data from six representative alignment assessments was used to develop the taxonomical study (see table 5 and table 6). Theoretical and practical insights were analysed according twelve underlying constructors, six theoretical and six practical. The design of the taxonomy implies that studies can be examined by using either of these two or both insights. For instance, both insights were applied to Luftman's approach (2003). A description of his research is summarised according the theoretical and practical capabilities of the study. Each constructor has been highlighted to help readers to identify the taxonomy's functionality. Luftman (2003) research's *objective* aims recommendations for improving alignment based on maturity categories by means of a *model* originally adapted from the Capability Maturity Model (CAM). This study not only considers six categories (communication, competency, governance, partnership, technology scope, and skill) to assess alignment maturity in any organisation, but also to achieve and maintain such maturity alignment. His roundtrip *scope* for assessing, achieving and maintaining alignment suggest a dynamic *paradigm* process to understand alignment. To use in *practice* his assessment, Luftman applies a questionnaire and interviews with IT and business executives. These executives are in charge of the final overall alignment score, which is agreed by using group-decision-analysis *techniques*, to carry out consensus. In fact, this technique considers executive's perceptions by measuring a synergy between individual maturity criteria. Results are based on mutual understanding of such perceptions which relate to a *strategy* that exclusively assesses current organisational planning. His research *product* is a conceptual framework which can be applied via questionnaire. The taxonomy also permits partial examinations. By using the theoretical substructure only theoretical characteristics related to an assessment can be examined. In doing so, the content of six constructors (objective, nature of strategy, dimension, type of measurement and background model) are applied. An evaluation of the theoretical substructure is applied to Avison et al. (2004). Avison et al. (2004)'s research *objective* aims to determine alignment levels by means of the strategic alignment model (SAM). Their practical framework understands alignment in a dynamic environment by working on the process *paradigm*. They consider realised *strategy* since documentation of projects completed is used to perform the assessment. A classification which matches projects based on the strategic alignment *model* (SAM) perspectives represents their type of *measure*. Subsequently, a graphical representation is produced to evaluate the alignment level. In addition, practical capabilities of an assessment can also be outlined. For instance, Hale & Cragg (2003) put in practice an alternative to measure alignment for small and medium enterprises (SMEs) by assessing people perceptions. This *scope* embraces exclusively assessing alignment regardless achieving or maintaining alignment. They provided a deliverable in terms of an instrument based on interviews and a questionnaire applied to top management levels. They assess synergy of two scores to depict a moderation type of *measurement*. Finally, three more

studies were filled into the taxonomy. Data content from Chan et al. (1998), Reich and Benbasat (1998) and Papp (2006) was added. Their theoretical and practical capabilities can also be visualised in table 5 and table 6. Theoretical and practical capabilities of the six representative studies can be benchmarked by means of the two substructures. Even though the process to fill out the data from such studies is complex, the taxonomy guide into the underlying constructors comprised by typical alignment assessment. It is expected for any user of the taxonomy to be familiar with a study that will be applied into it.

Study	Aim objective	Nature of strategy	Paradigm	Dimension	Type of measurement approach	Background Model
Avison et al. (2004)	Determine alignment levels by means of SAM in practice	Realised	Process	Intellectual	Matching	Strategic Alignment Model Henderson & Venkatraman (1990)
Chan et al. (1998)	Measure existing use of IT in organisations	Realised	State	Social	Moderation	SROBE Venkatraman's (1989)
Hale & Cragg (1996)	Measure alignment for small firms & investigate factors that influence alignment	Realised	State	Social	Moderation	STROBE - Venkatraman's (1989) STROIS - Chan's (1992)
Luftman (2003)	Identify recommendations for improving alignment based on the organisation's maturity	Realised	Process	Social	Moderation	Capability Maturity Model (CMM)
Papp (2006)	Identify specific recommendations for improving alignment	Intended	Process	Intellectual	Matching	Strategic Alignment Model Henderson & Venkatraman (1990)
Reich & Benbasat (1998)	Measure the social dimension of alignment	Intended	State	Social	Matching	Horovitz's(1984)'s strategic dimensions

Table 5 Theoretical constructors of the taxonomy applied to six alignment assessments

Study	Practice/Audience		Scope			Output (conceptual deliverable)	Technique of measurement	Product	Target (Limitation)
	Type of firm	User	Ac	As	M				
Avison et al. (2004)	Any	Top Mgmt	✓	✓	✓	Practical framework	Classification of projects	Graphical representation	Based on documentation
Chan et al. (1998)	Any	Top Mgmt		✓		Instrument	Typology and comparative measurement	Questionnaire	Based on perceptions
Hale & Cragg (1996)	SME	Top Mgmt		✓		Instrument	Scoring two different items	Questionnaire & interviews	Based on perceptions
Luftman (2003)	Any	Top Mgmt	✓	✓	✓	Conceptual framework	Group decision analysis	Questionnaire	Based on perceptions
Papp (2006)	Any	Top Mgmt	✓	✓	✓	Model	Positioning of SAM perspectives	On-line questionnaire	Based on perceptions
Reich & Benbasat (1998)	Any	Top Mgmt		✓		Interpretative analysis	Cross-reference analysis	Questionnaire & interviews	Based on documentation

Ac= Achieving alignment  
As= Assessment alignment  
M= Maintaining alignment

Table 6 Practical constructors of the taxonomy applied to six alignment assessments

## 6 DISCUSSION

Two objectives have been addressed in this research: evaluate the applicability of the taxonomy as well as indicate the results of the comparative analysis of six representative alignment assessments, both concerns the discussion of this research. The functionality of the taxonomy was applied by means of testing theoretical and practical capabilities of six representative studies. Twelve constructors were defined to characterise them, six practical (*practice/audience, scope, output, technique of measurement, product and target/limitations*) and six theoretical (*aim objective, nature of strategy,*



*paradigm, dimension, type of measurement approach & background model*) constructors. Even though filling out data from such studies to the taxonomy structure is not a simple process, the taxonomy guides into the content of underlying constructors for alignment assessments and provides a comparing mechanism. The comparative analysis reveals that most alignment assessments tend to measure senior management perceptions instead of tactical or operational mechanisms within organisations. These mechanisms create restrictions for assessing consistently alignment, since alignment measurements should consider a variety of indicators at all organisational levels (Zee, 2001). This research gap has been raised in Gutierrez et al. (2006) work which suggests an instrument which comprises strategic, tactical and operational levels to assess alignment within SME. Generally speaking, a process paradigm has been more embraced by researchers. This coincides with Avison et al. (2004) arguments in the sense that earlier research on alignment has been focused predominantly on “state” perspectives. In addition, the social dimension leads against the intellectual dimension to approach alignment. More studies have opted to consider a social dimension as this assumes that alignment tends for mutual understanding of business and IT mission, objectives and plans. This has a wide consideration about people behaviour within the whole process extent of alignment since it is required people’s mutual understanding of alignment to increase the level of success in an alignment implementation. The taxonomy confirms the variety of approaches to assess alignment however taking in account the comparative analysis might suggest a possible trend to research alignment. This alignment’s trend shapes an approach more dynamic and related to process-oriented issues which also has been included as a privileged interest in IT governance literature and cross-related activities of organisational business processes (Thorogood et al., 2004).

## **7 CONCLUSIONS AND FURTHER RESEARCH**

This paper forms part of an ongoing research on alignment assessment. This research contributes to the IT and business planning process by providing a guide for six theoretical (*aim objective, nature of strategy, paradigm, dimension, type of measurement approach and background model*) and six practical (*practice/audience, scope, output, technique, product and target*) constructors which allows comparing insights into current alignment assessments. In this research six representative studies of alignment assessment were applied into the taxonomy to verify its functionality. Results clarify a trend in alignment assessments towards a social paradigm. Most of the evaluated studies aim to adopt mutual social understanding between factors that inhibit or enable the process of achieving alignment. This implies a wide consideration on people behaviour and subjective factors throughout the alignment process. It becomes apparent an alignment research more dynamic and related to process-oriented measures based on complex organisational criteria. Despite the increasing relevance of alignment in the industry, few studies look for practical capabilities and most studies remain theoretical. Research into alignment remains still complex for practical proposes which limits organisations in the planning to be aligned. The proposed taxonomy helps in this planning process when insights into various alignment assessments need to be exhibited but further research in the area is required. The taxonomy was designed by means of limited sources of development which are the result of only a sample of representative studies. Therefore, an extension of this research is a contribution with additional and refined constructors as well as guidance to identify them. In addition, an extensive review of relevant articles and examination of techniques of comparison might contribute to the functionality of the taxonomy.

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