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Strategic Short-termism as an Issue of Top-Teams' Temporal Orientation

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ABSTRACT

Short-termism among firms, the tendency to excessively discount long-term benefits and favour less valuable short-term benefits, has been a prominent issue in business and public policy debates but research to date has been inconclusive. We study how managers frame, interpret, and resolve problems of intertemporal choice in actual decisions by using computer aided text analysis to measure the frequency of top-team temporal references in 1653 listed Australian firms between 1992-2005. Contrary to short-termism arguments we find evidence of a significant general increase in Future orientation and a significant decrease in Current/Past orientation. We also show top-teams' temporal orientation is related to their strategic orientation, specifically the extent to which they focus on Innovation-Expansion and Capacity Building.

Keywords: temporal orientation, short-termism, strategic cognition, naïve Bayesian classification.

Strategic Short-termism as an Issue of Top-Teams' Temporal Orientation

Short-termism, the tendency to excessively discount long-term benefits and favor short-term benefits, has been a prominent issue in business and public policy debate particularly in the Anglo-American economies since the late 1980s (Business Council of Australia (BCA), Black, 1990; 2004; Demirag, 1998; Drucker, 1991; Motohashi & Nezu, 1997; Porter, 1992). Issues of intertemporal choice, a characteristic of decisions in which the timing of costs and benefits are spread out over time (Loewenstein & Thaler, 1989), are central to short-termism as senior managers most important problems (e.g. technology investments, workforce training, entering new markets) involve choosing between conflicting short-term and long-term strategies (Laverty, 1996). We need to be cautious about ambit short-termism claims as parties expressing them can have various underlying interests, ranging from managers trying to deflect performance pressures from shareholder to unions seeking to protect members' jobs and conditions. Given that failure to give proper attention to the future could have serious deleterious economic consequences for firms and economies at large, a substantial body of empirical research into firm-level short-termism exists.

Most short-termism research has used financial data and discounting utility formula to deduce implied discount rates to establish whether actual discount rates are greater than they should be in a rational, informed world. However findings in some financial studies of excessive discounting that are interpreted as evidence of short-termism can simply reflect increased perceptions of uncertainty about the future and, in a sense, indicate 'correct' discounting for the perceived uncertainty (Grinyer, Russell, & Collison, 1998). Thus, discount rate research has perpetuated the debate rather than established the existence of short-termism or its consequences. This may reflect the use of financial variables as indirect indicators of short-termism.

Laverty (1996) suggested a more direct approach to studying short-termism was needed: "…understanding how managers frame, interpret, and resolve problems of intertemporal choice is critical to advancing the debate. In general, there has been a limited study of the ways in which executives deal with the future … Few attempts have been made to link individual temporal orientation and the individual's preferences within an organizational setting. Specifically, I know of no study that has examined intertemporal choice in actual decisions by managers" (Laverty, 1996: 847). Only one recent study appears to have responded to Laverty's (1996) suggestions. Using interviews and survey questionnaires, Marginson and McAulay (2008) investigated whether a number of organizational and individual level factors (e.g. level in the hierarchy, performance measurement, perceived role ambiguity) were related to individuals' temporal perspective (short-term versus long-term). While this was an important initial study involving managers' subjective temporal perceptions, it was restricted to how intra-firm variables are related to managers' temporal perceptions within a single US firm at one point in time.

Marginson and McAulay's (2008) research design did not allow them to consider key issues in the short-termism debate such as the prevalence of short-termism across a broad sample of firms and industries, whether this prevalence has increased over time, and the influence of managers' temporal perspective upon strategic choices. We employ a design that investigates these questions by measuring top-teams' temporal orientation (TO) from 1653 firms listed on the Australian Stock Exchange (ASX) over the period 1992-2005, and examining the association between top-teams' TO and their strategic focus.

BACKGROUND

Short-Termism: Causes and Effects

While early explanations of short-termism relied on cultural differences, the most prominent contemporary explanation of short-termism suggests it arises from a major

structural change of ownership patterns that has seen the emergence of institutional funds as dominant shareholders in Anglo-American economies. Institutional investment managers compete for individual investors' funds and enhance their reputations and career progress by demonstrating superior quarterly returns (Jacobs, 1991). When this behavior is combined with increased shareholder activism, business managers, it is argued, are obliged to focus on short-term strategies that generate quick profits rather than long-term strategies designed to create and sustain competitive businesses (Drucker, 1986; Porter, 1992). In 1995, institutional investors ownership of their national equity markets in Australia, the UK and the US had risen to 50%, 69% and 36% respectively (Webb, Beck, & McKinnon, 2003), and these percentages continue to increase. For example, in 2005, Australia's managed funds industry managed $A814 billion, which is expected to increase to $A2.3 trillion by 2015. Additional explanations for short-termism focus on the firm and suggest that shorter managerial tenure (BCA, 2004) and short-term performance monitoring/incentive schemes encourage managers of both firms and investment funds to adopt short-term projects to enhance career prospects and remuneration (Palley, 1997). Short-termism has also been linked with increased share price volatility, share ownership churning, market bubbles, and over-corrections associated with herd behavior in response to good or, more typically, poor company earnings information (Dennis & Strickland, 2002; Fong, Gallagher, Gardner, & Swan, 2004). We note the climate change debate can be viewed as a new variation on the short-termism issue.

Temporal Perspective: Temporal Framing and its Effects

For at least 20 years researchers have argued that time is a fundamental but neglected variable in organizational and managerial research particularly in respect of the influence of managers' subjective, temporal perceptions (e.g. Ancona, Okhuysen & Perlow, 2001; Bluedorn & Denhardt, 1988; Butler, 1995; Mosakowski & Earley, 2000; Roe, 2008). Mosakowski and Earley's (2000: 796) observation in relation to strategic management is

representative of these views: "Although strategy researchers incorporate time in many ways, they generally ignore a subjective view of time and the temporal perceptions of actors in their models". A range of useful temporal dimensions have been identified by researchers (e.g. Ancona, Okhuysen & Perlow, 2001; Mosakowski & Earley, 2000) and most incorporate what Zimbardo and Boyd (1999) call 'temporal perspective' (TP). Zimbardo and Boyd argue that TP is a foundational process in both individual and societal functioning and define it as "the often nonconscious process whereby the continual flows of personal and social experiences are assigned to temporal categories, or time frames that help to give order, coherence, and meaning to those events" (1999: 1271-72).

Zimbardo and Boyd (1999, 2008) suggest TP is important because it is used in encoding, storing, and recalling experienced events, forming expectations, goals, contingencies, and imaginative scenarios. Importantly, people's TP influences their current perceptions, judgments and motivations because they use it to frame their current experiences by drawing on the past, present or future. For example, a person's nostalgic, positive or aversive memories of past events can significantly affect their current interpretations and actions, possibly even dominating the intrinsic qualities of the situation. Similarly, framing a current, aversive event in terms of positive, future outcomes can help a person respond with more proactive coping strategies which moderates the degree of averseness. If an individual develops a tendency to habitually overemphasize one of these three frames when making decisions it represents a cognitive temporal bias. Zimbardo and Boyd (1999, 2008) reviewed a considerable body of research into the relation of TP to other psychological constructs and behavioral outcomes that we draw on to explain the importance of TP and how we expect top-team TO will be related to their strategic focus.

People with a future TP focus on achievement, planning, and on striving for future goals and rewards. This includes being willing to delay immediate gratification and structuring their

activities and outlook in a way that increases the likelihood of obtaining future outcomes such as undertaking detailed planning, completing current tasks and improving their knowledge and skills. While future oriented persons have a sense of "time crunch" (Zimbardo & Boyd, 1999: 1281), they manage the perceived demands in ways that increase the probability of their fulfilling these demands and meeting their high standards.

Persons with a present TP have frequently been contrasted with those with a future TP (e.g. Jones, 1988). Framing events in the present tends to make a person's actions more subject to the forces of situational press, the intensity or quality of the stimulus, or social aspects of the situation. A present TP is therefore associated with more hedonistic, risk-seeking and impulsive attitudes and activities as well as energetic engagement with a wide range of activities, but without a clear longer-term context for actions and activities. Time urgency associated with a present TP can also be related, according to Carson, Lanier, Carson and Guidry (2000: 1146), to the overestimation of elapsed time, making speedier judgments, a quicker pace of activity, a greater tendency to mimetic responses, and a preference for change over continuity.

Finally, a past TP, at least a positive past TP (Zimbardo & Boyd, 1999, 2008) tends to be associated with strong, warm, even sentimental feelings and associations with the past. The behaviors associated with a past TP tend to be more cautious, conservative, and sensitive to the expectations of authority figures, more relationship focused, and more risk averse. The central elements of each TP can be broadly represented by Kluckholn and Strodtbeck's (1961) characterization of cultural values as either relatively more oriented towards "being", that is, immediate gratification and spontaneous action (i.e. present TP); "doing" with a focus on action and long-term, measurable achievement (i.e. future TP), and "relational" with a focus on maintaining a collective sense over generations and time (i.e. past TP).

We view top-teams' TOs as an important influence on the strategic issues and concerns they attend to and on their subsequent interpretations, decisions and actions by influencing how they frame what they attend to and their interpretations. This implies that TO is likely to be central to shaping managers' intertemporal choices and is an important cognitive element in short-termism. We avoid describing TO as a simple, direct cause of short-termism because we share Zimbardo and Boyd's (1999) interpretation of how TP operates. They describe TP as being both situationally determined and as a relatively stable individual difference that is multiply determined by many learned factors including culture, education, class, and family. Being pervasive in their lives, people can be relatively unaware of its influence, nevertheless TP "provides a foundation on which many more visible constructs are erected or embedded, such as achievement, goal setting, risk taking, sensation seeking, addiction, rumination, guilt, and more " (Zimbardo & Boyd, 1999: 1272). The notion of perceptions, attitudes and behaviors being embedded within people's TP eschews the idea of a simple causal relationship between them.

Defining and Measuring Top-teams' Temporal Orientation

Our approach reflects an attention based view of the firm (ABV) (Abrahamson & Hambrick, 1997; Barnett, 2008; Ocasio, 1997; Simon, 1997). Drawing upon cognitive psychology, the ABV assumes that senior managers operate in an information environment that is too rich and complex to be fully attended to and, in order to make sense of it, senior managers employ an attention process involving "the noticing, encoding, interpreting, and focusing of time and effort by organizational decision-makers on both (a) issues: the available repertoire of categories for making sense of the environment: problems, opportunities, and threats; and (b) answers: the available repertoire of action alternatives: proposals, routines, projects, programmes, and procedures" (Ocasio, 1997: 189). Partly reflecting their particular environments but also their different experiences, personalities and values (Hambrick &

Mason, 1984), top-teams attend to different features of their environment and what they attend to shapes subsequent interpretations and actions. As with individuals, a top-team's TO is a key influence on what it attends to and its interpretations. While a top-team can be heterogeneous in terms of individual members' TPs (e.g. Gibson, Waller, Carpenter, & Conte, 2007), selection effects (e.g. Cho & Hambrick, 2006), external environmental influences, organizational structures and policies (Cascio, 1997; Marginson & McAulay, 2008), and the influence of powerful individuals leads to the emergence of at least a partial, perhaps unconscious, tacit consensus among its members about their temporal framing of judgments, decisions, and actions. We call this shared, temporal framing the top-team TO. Conceptually we view it as directly analogous to subjective, individual TPs and as influencing team perceptions, attitudes and behaviors in similar ways. However we prefer the term 'TO' rather than 'TP' to distinguish our conceptualization of the construct as a shared, strongly situationally influenced variable from Zimbardo and Boyd's (1999, 2008) treatment which is primarily from an individual difference perspective.

Our concern is with organizations' top-teams, that is, those forming the senior decision-making groups. Much of the research dealing with managerial cognition and the influence of managers' characteristics and beliefs on decision-making has focused on the top-team or upper echelon as a unit (e.g. Hambrick, 1998; Hambrick & D'Aveni, 1992; Hambrick & Mason, 1984; Hambrick, Nadler, & Tushman, 1998; Miller, Burke, & Glick, 1998; Sanders & Carpenter, 1998). Measuring top-teams' temporal orientation is challenging since gaining direct access to senior managers is difficult. The difficulty is increased if, as in this case, we seek to access the cognitions of large numbers of top-teams over a relatively long period of time. Such considerations effectively eliminate commonly used methods such as surveys and interviews and recommend the use of archival data that is comparable and available over time.

We describe top-teams' temporal orientation by measuring the frequency with which they frame their strategic discourse within past, present and future temporal contexts.

The words people use to frame their actions and perceptions are a reliable guide to their TP (Zimbardo & Boyd, 1999) and all natural languages have adverbs that refer to time as well as aspects and modalities of verbs that include temporal information (Mosakowski & Earley, 2000: 797). The temporal words and categories people use and the frequency with which they use them provides insight into the relative importance of the various temporal perspectives underlying their world view. Pennebaker and colleagues (e.g. Pennebaker & King, 1999) find support to the presence of different temporal frames in people's communications and the relation of these frames to other aspects of their psychological functioning and behavior. Pennebaker and King (1999) found four relatively stable factors in people's linguistic patterns including two which they called Immediacy and The Social Past that bear a clear relationship to what Zimbardo and Boyd (1999) called present and past TP (see review by Pennebaker, Mehl & Niederhoffer, 2003). This aspect of language was central to our design that used the relative importance or frequency with which top-teams frame their discourse in past, present and future contexts as indicators of their temporal orientation.

Our approach involves the content analysis of firms' annual reports that are required by law of all ASX-listed firms. Duriau, Reger & Pfarrer (2007) reviewed 98 studies that had used content analysis in an organizational research context around a third of which relied on annual reports. Duriau, Reger & Pfarrer concluded: "[our review] revealed the strength of basic content analysis in studying both manifest and latent constructs that would be more difficult to access using alternative techniques" (2007: 26) and that "research in strategy and managerial cognition have yielded particularly interesting results" (2007: 5).

While content analysis of annual reports has been used regularly by organizational researchers, two criticisms of the approach are made. Both centre not so much on content

analysis per se but rather the annual report text. First, questions of attribution suggest that, since annual reports are prepared by 'consultants, communication departments, or public relations practitioners' they do not reflect the cognitions of senior managers. Second it is argued impression management occurs: that is, even if senior managers influence the content, the content is more likely to reflect their attempts at impression management rather than their actual cognitions. In this view, managers deliberately present themselves as long-term or short-term focused, or more concerned with innovation or capacity building than they actually are depending on what they believe significant stakeholders prefer them to be focusing on. Arguments against these criticisms can be usefully considered under three main headings: logical, direct validity tests, and general empirical findings.

Firstly, annual reports have a legal status and are closely scrutinized by a variety of stakeholders and commentators such as company analysts, investors and financial journalists. It seems unlikely that senior managers readily expose themselves to the legal and reputational risks of simply signing off on whatever ghost writers produce. Abrahamson and Amir (1996) showed that the content of presidents' letters influenced investor behavior independently of financial information. As part of their study that analyzed presidents' letters in annual reports from US airlines, Cho and Hambrick (2006) interviewed communication executives in five publicly traded US companies as well as the head of a corporate communications consultancy about how annual reports are produced. They concluded: "In essentially every case, multiple drafts are circulated to all top executives for review or refinement. Thus the letter [i.e. president's letter found in US company reports] is not the province of only one or two people, and certainly not of outsiders alone" (Cho & Hambrick, 2006: 459).

Secondly, some studies have directly examined the validity of cognition measures from annual reports. Most notably, Fiol (1995) carried out a unique study comparing managerial attributions made in annual reports with those in internal, managerial documents from a

sample of US firms in the forest products industry over 20 years. She found that, while the patterns of causal attributions were correlated in the two types of documents, the positive/negative orientations of the documents were not related. This suggests that while non-evaluative comments in annual reports can be viewed as reflecting managerial cognitions, evaluative ones are more strongly influenced by impression management.

Finally, there is a body of empirical evidence demonstrating theoretically meaningful relations between annual report measures of cognition and a variety of independently derived measures ranging from organizational performance, competitive moves, CEO compensation, strategic group membership, organizational culture, and so on (Duriau, Reger & Pfarrer, 2007). Of particular relevance here is the study by Kabanoff and Brown (2008) that derived a number of indicators of strategic focus or orientation using content analysis of Australian firms' annual reports. Drawing upon Miles and Snow's (1978) well known model of generic strategies, Kabanoff and Brown (2008) identified the relative amounts of attention given to 21 strategic issues or themes (e.g. cost reduction, marketing focus, core business emphasis, restructuring, financial performance) in almost 4000 annual reports from Australian firms over 12 years (1992-2003). Factor analysis of these themes reduced them to seven main factors that resembled a number of the strategic dimensions Miles and Snow (1978) used to characterize differences between prospectors, analyzers and defenders. Kabanoff and Keegan (2008) tested the construct validity of three of the seven strategic factors (innovation; capacity building; operational efficiency) by correlating them with financial or accounting indicators of firms' resource allocations, arguing that firms' resource allocations should generally reflect senior managers' strategic concerns and objectives (e.g. Noda & Bower, 1996; Schmidt & Brauer, 2006). For example, a focus on innovation was expected to relate to an overall index of firms' level of investment and performance in innovation (R&D spending and patents obtained) while capacity building should be related to level of Capital Expenditure (CapEx).

These expectations were borne out for all three factors: there was evidence of convergent validity with each strategic factor being related to the relevant measure of resource allocation, and there was evidence of good discriminant validity with accounting measures generally correlating with the relevant strategic factor but not with unrelated strategic factors.

Considering the evidence, it is reasonable to conclude that, in general, annual reports can be a valid source of information about a wide variety of managerial cognition about non-evaluative issues, while evaluative statements about those issues are more prone to impression management. Since this study is concerned with a non-evaluative construct (temporal orientation) there is good reason to believe that our measures are unlikely to be seriously affected by impression management.

Hypotheses

Based on these arguments we identify hypotheses addressing two main issues: change over time in top-teams' temporal orientation and the relation between top-teams' TO and their strategic focus. Our first hypothesis is based on the premise that short-termism has increased. This has the advantage of giving clear and precise predictions to be tested, however it is largely a matter of convenience since the evidence for short-termism is inconclusive.

Hypothesis 1a: Top-teams' future orientation has decreased significantly over the period 1992-2005.

Hypothesis 1b: Top-teams' current/past orientation has increased significantly over the period 1992-2005.

The key tradeoffs suggested by short-termism theory are increased managerial preferences for strategies that have a higher likelihood of resulting in immediate financial benefits to the fi*rm* and decreased preferences for strategies that involve higher costs in the short-term with the potential for greater but less certain future payoffs. Of Kabanoff and Brown's (2008) seven strategic themes two clearly reflect differences on the part of top-

teams' concerns for low risk and/or immediate benefit versus higher risk/longer term payoff: innovation/expansion (e.g. R&D, new markets and products) and capacity or capability building (e.g. infrastructure and alliances)[1]. Kabanoff and Keegan's (2008) findings support for this interpretation by demonstrating that the degree of strategic focus on these two dimensions was significantly related to the level of resources allocated by firms to activities encompassing these two dimensions. Therefore it is hypothesized:

> *Hypothesis 2a: Top-teams' future orientation is positively associated with their degree of focus on (a) innovation/expansion and (b) capacity building.*

> *Hypothesis 2b: Top-teams' current/past orientation is negatively associated with their degree of focus on (a) innovation/expansion and (b) capacity building.*

To summarize, a key, cognitive element in senior managers' strategic short-termism is their temporal orientation. Top-teams with a low future (high current/past) orientation are less likely to make intertemporal choices favoring strategies that involve short-term costs and potentially larger, less certain future benefits. We investigate the temporal orientation of top-teams from Australian firms by analyzing the frequency with which they frame strategic discourse in annual reports within different temporal contexts and examine whether their TO has changed over time, and the relation of temporal orientation to their strategic orientation.

METHODS

Database

Our database was extracted from *Connect4*, a commercial supplier of Australian annual reports in electronic form since 1992, and initially contained 7229 annual reports from 1996

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[1] CustomerVsCapacity was one of several bi-directional factors found by Kabanoff &Brown (2008) in which positive scores indicate a stronger Customer Focus while larger negative scores indicate strong Collaboration/Alliances and Infrastructure/Capabilities emphases. This suggests that some content themes tend to 'displace' one another, or at least tend not to appear together in the same annual report. For simplicity and consistency in this paper we it Capacity building and reverse the sign of the original values.

individual firms for the period 1992-2005 but this reduced to 5969 reports from 1653 individual firms from ten Global Industrial Classification (GIC) sectors after reports with less than 20 usable sentences or no GIC code were removed. Strategic factor scores were accessed from Kabanoff and Brown (2008) and additional strategic factor scores for 2004-2005 annual reports that were available to us resulted in strategy measures being available for 5239 annual reports from 1466 firms. As described earlier, these strategic factors were created by factor analyzing a larger set of strategic themes. The two factors we drew on for this study were: innovation/expansion, loading on themes of marketing, new products and development, R&D, peer comparisons and new markets, and capacity building collaboration/alliances and infrastructure/capabilities aspects.

A Machine Learning Approach to Identifying Temporal Themes

We provide a relatively detailed description of our method for two reasons: computer aided text analysis (CATA) is not widely used by organizational researchers, and we also encountered both considerable advantages and some important challenges in using this approach in the present context which can assist those interested in using a similar CATA technique. Our approach to the problem of measuring temporal orientation in annual reports was based upon the method adopted by Kabanoff and Brown (2008) who used a 'machine learning' (ML) (e.g. Sebastiani, 2002) approach to CATA. This was because we faced a similar challenge: how to measure the presence of a number of relatively complex themes (i.e. temporal references) that are expressed in a wide variety of ways. The ML approach has advantages over more traditional dictionary approaches in such a context because it does not require the extremely time-intensive development of coding schema, rules, or word lists, which can be nearly impossible to implement for complex category sets. The effort required to develop a comprehensive, rule-based coding dictionary sufficiently broad to include all or most of the synonyms for any broad theme can approach that of manual coding.

ML refers to a process by which a text classifier is created by 'learning' a set of pre-classified texts. The ML approach allows the identification of themes of interest from words that tend to co-occur with that topic or theme. It uses a mathematical basis for determining words associated with a theme of interest, rather than requiring a human coder to identify and design a rule for identifying each association. Rather than scoring sentences on a Yes/No basis based on the presence of a specified word or phrase from a list, a trained classifier assigns a probability to each sentence (between 1.0 and 0) in a non-training dataset indicating the likelihood that each category is present in each sentence.

We assembled a database of all annual reports in WORD format in the *Connect 4* database and, using purpose-written programs, extracted the sections attributed to members of the top-team in each report. These sections were, in turn, used to create a database of sentences, or in the case of very complex sentences, simple sentence-like parts of the complex sentences. The sentence database creation process identified and placed square brackets around: (1) common words (e.g. 'the', 'a', 'may', 'will', 'next', 'was') listed in a *stopword* list supplied with the PERL naïve Bayesian classification library of files used when training and running classifiers (Williams, 2003), (2) rare and unusual words such as company names identified by exclusion using *Wordnet* (Fellbaum, 1998), a software package that includes a comprehensive lexical database of the English language, and (3) numerical data. Characters in square brackets do not register when training and running classifiers. This process has two goals: to prevent extremely common words with little or no discriminating value from smothering the classifier; and to reduce the likelihood of the classifier being 'biased' by words that are rare or associated with particular firms (e.g. names).

In a nutshell, to complete the procedure, once a sentence database is assembled, a classifier is trained using a subsample of sentences that are allocated to one or more of the categories by coders. When validity tests indicate the classifier is sufficiently trained to

identify all the categories in the classification set with sufficient accuracy, the classifier is used to estimate the probability that each category is present in each sentence and an aggregate score is generated for each category for each annual report. These scores are then adjusted by dividing the aggregated scores by the number of sentences in each annual report.

Our intention was to measure temporal orientation using six categories: long term past, recent past, current, near future, distant future, and ongoing. These six categories were identified on the basis of existing literature, logic, and initial reading of annual reports. However, we discovered fairly quickly that, while the temporal categories or themes we sought to measure shared some of the characteristics of the strategic themes measured by Kabanoff and Brown (2008) such as being relatively complex and varied, they also had a number of other features that made them less amenable to a straightforward application of ML-based CATA. Space restrictions preclude supplying full details of our responses to the challenges that emerged, but we provide sufficient detail both to explain our final temporal categories and to assist future researchers attempting similar CATA applications.

The challenges we encountered stemmed from five properties of temporal information in the text. First, we were unable to develop coding rules for reliably identifying and distinguishing between the six categories for two reasons – the ubiquity and sheer variety of temporal information, with sentences often containing several different kinds of temporal references; and there was often a degree of ambiguity that could not be resolved at a sentence level. Second, explicit temporal information was often contained within the square bracketed words and numbers and, while a human coder could see and use the information, the information was not available to the classifier. Third, temporal information in the sentences was available in three forms: numerical references that contained specific temporal information (e.g. '1995' in a 1994 annual report refers to one year after the reporting period; 'the 60's' in the same annual report refers to three decades in the past); explicit temporal text

references that had varying degrees of specificity (e.g. 'next year', 'the current fiscal year', 'the reporting period', 'in a few years'); and implied or latent temporal information where the sentence had a temporal orientation by the nature of its content, but no specific temporal reference was present. Most sentences fell into the latter category. Fourth, the naïve Bayesian classifier algorithm is based on the assumption that categories are associated with word usage patterns in sentences as people will tend to discuss a subset of topics when a sentence fits a particular category. However, it is possible to discuss the same topic using different temporal orientations (e.g. 'we built a new tailings dam', 'we will build a new tailings dam'), which reduces the discriminating ability of the classifier. Fifth, by their nature, annual reports are primarily focused on current and past events so while most sentences have a temporal orientation, it is usually towards the current or the past. A significant proportion of the sentences with a future orientation (FO) also had current and/or past orientations.

Our first strategy was to attempt to make more of the temporal information in the text available to the classifier algorithm. All words with clear temporal meaning were removed from the *stopword* list and all numeric temporal references were changed to a standard set of text expressions (e.g. 'two decades [in] [the] past', 'three years [in] [the] future', '[the] current fiscal year'). These changes were to each year of data (e.g. the date 1994 was changed to '[the] current year' for 1994 annual reports but became 'one year [in] [the] past' for 1995 annual reports). The resulting sentence database was checked to ensure that numerical information with a similar structure to a specific temporal reference form was not modified (e.g. 'we produced 1996 ounces of gold').

Insert Figure 1 about here

Next, we analyzed the distribution of the numeric references in the modified database (see Figure 1) and, with our increased understanding of the use of temporal references,

determined our initial category boundaries. Current year references clearly dominated, while 'one year [in] [the] past' and 'one year [in] [the] future' accounted for 42% and 33% of past and future numeric references respectively. In part this reflects that annual reports are published after the reporting period, some writers refer to the reporting period as the current year while others refer to it as the past year. Further, when discussing the current year, some use calendar year, some the fiscal year and some the financial year, which, in Australia, is July 1 to June 30. The use of calendar years increases with distance from the current year, but the use of fiscal and financial years means that 'current year' can refer to up to 18 months prior to, or 12 months ahead of, the time the report is presented. We therefore decided to include one year in the past and one year in the future in the 'current' category. Further analysis of the distribution of numerical past/future references suggested that the remaining past references could be split into two groups (2-5 years in the past; greater than 5 years in the past) and the remaining future references could be split into three groups (2 years in the future; 3-5 years in the future; greater than 5 years in the future). An additional consideration in the future classification was the strong association of the word 'strategy' with sentences containing numerical references to three, four, and five years in the future. We therefore revised the coding of standardized annual and decade expressions to a smaller set of temporal categories (i.e. present; 2-5 years in the past; greater than 5 years in the past; 2 years in the future; 3-5 years in the future, and greater than 5 years in the future).

Our next concern was the specific temporal words and phrases, which were often as specific as the numerical references (e.g. "three years ago", but were more diverse in form, and far more numerous. With the aim of making specific numerical and verbal temporal references equivalent, we changed the specific verbal temporal references to the same set of standardized expressions we had used for the numerical temporal references i.e. present, 2-5 years in the past, and so on. Our goal was to create a set of sentences with standardized

temporal references, place the standardized temporal references in square brackets, train a classifier using the remaining words in the sentences, and then use the classifier to classify all sentences, including sentences with only latent temporal references. While some human judgment is required when deciding the limits of what text expressions can be reasonably coded (e.g. 'near future') this approach had the advantages of being objective and essentially mechanical, so it could be reliably replicated. The down side is that it is extremely labor intensive. We expected that sentences containing explicit temporal words, phrases or dates would contain associated words that could be used to train a general text classifier.

The sentences with the standardized expressions were sorted by the six temporal categories. Sentences with multiple categories or with latent temporal references that clashed with the standardized temporal reference were eliminated. This produced six sets of sentences each of which was made up of sentences that were 'pure' examples of one temporal category. We also made a list of sentences with no temporal information. A sample of sentences randomly selected from each of these sets with equal numbers of examples from each temporal category as well as from sentences with no temporal information (the training data) was then used to train a classifier. The resulting classifier was used to classify the remaining sentences in each of the 'pure' example lists (the holdout data).

Insert Figure 2 about here

The frequency distributions of the different temporal categories estimated by the classifier for each of the holdout sets of sentences representing different temporal categories are shown in Figure 2, which shows that both past categories, the current category, and the 2 years in the future category had the same distribution, while the two remaining future categories shared a different distribution. This suggested we could identify reliably only two temporal categories: FO (three or more years in the future) and Current/Past orientation

(C/PO), which included up to two years in the future. The two distributions overlapped and, when the training data were used to produce a classifier using just these two categories, it classified the holdout data with 85% accuracy.

When the full database was processed by the second classifier, the estimated frequencies for FO and C/PO, at the annual report level, were *negatively* correlated with the frequency of specific numeric and text references. Additionally, validity tests at the sentence level (which involved both of the authors separately reading sentences that had been scored by the classifier as having a high probability of containing a temporal theme) revealed that accuracy of classification was extremely low. We interpreted this result as evidence that sentences with specific temporal references represented a biased sample of temporal references in the database: the subset of topics they addressed (and the subset of words used) was not representative of the topics and words used in the sentences with latent temporal references.

Our next step in attempting to develop a classifier for scoring temporal information was based on the following understanding of the process to date: first, while it seemed not possible to make the fine grained temporal distinctions we had originally sought, there was potential to distinguish between two crucial categories - Future and Current/Past; and second, we should not rely on sentences containing explicit temporal references since these were qualitatively different from other sentences. Thus, a classifier with this simpler category system should be trained using a more representative sample of all sentences in the database.

This next step involved using the sentences that had been identified by the classifier during the validation process as having a high probability of containing each category. As part of the validation process, the two authors had independently classified the selected sentences as having either a temporal reference to Future, Current/Past, Both or None. Interrater reliability during this process was reasonably high (89%) and, the extremely low accuracy of the classifier used to identify the sentences meant the sentences classified in the validity

process were close to a random sample. In other words, the proportions of sentences representing each category in the rater coded validity tests were similar to the proportions of sentences representing each category in the full database. Two thousand of these rater coded sentences were used to train a new classifier, which was used to score the full database and output at the sentence level was examined. While this categorizer was reasonably accurate, another issue was identified that we addressed before formal, independent validity testing.

When the classifier encountered a sentence where only a single temporal signal (i.e. Future or Current/Past) was present, it scored the probability of that category as one or close to one and the probability for the other category as zero or close to zero. However when both categories were present, and a large proportion of sentences with a Future reference also had a Current/Past reference, the classifier was less 'confident' and gave the most prevalent category a score some distance from one (say 0.7) and the less prevalent category a score closer to zero (say 0.4). Clearly, if both categories are present, we wanted the classifier to produce high probabilities for both categories. Our solution was to make separate classifiers for each category. When training these 'single category' classifiers, the choice was either 'the category is evident' or 'the category is not evident'. Sentences with both categories were treated as true examples for each category in each classifier. The None examples were treated as sentences where the category was not present for training both classifiers. The full sentence database was then processed by each 'single category' classifier.

Validity tests for both classifiers were conducted using an independent coder, a graduate research assistant reading and coding 600 sentences that had been scored by each classifier as having either a high or low probability of containing the temporal category. This indicated the Future classifier had a Type I error rate (sentence classified as Future but having no Future reference) of (7%) and a Type II error rate (sentence with a Future reference classified as

having no Future reference) of (37%), while the Current/Past classifier had a Type I error rate of (9%) and a Type II error rate of (10%). These levels were considered satisfactory.

Before reporting results, it is appropriate to comment on the methodology. Long and winding methodological journeys often occur when attempting a new approach to measuring abstract constructs, and they can be worth the effort, especially when they achieve their specific objective and generate a methodological insight that simplifies an entire measurement methodology. A feature that limits the use of the ML-based CATA is the effort required to train coders to code multiple categories as part of the process of training naïve Bayesian text classifiers. The greater the number of categories, the more difficult the two training tasks, and the more difficult the validation procedure. Additionally, we now know that, if multiple categories can co-occur in the same sentence, the resulting probabilities are likely to be biased downward. Single category classifiers, on the other hand, require coders to make a single decision 'is the category present or not?' which requires far less training. Additionally, coders' decisions should be more accurate as they do not have to make multiple decisions for a range of categories. Our experience suggests the single category classifiers acquire valid discrimination capacity with lower numbers of training sentences and it is simple to perform validation tests for both Type 1 *and* Type II errors. Finally, when using multiple category classifiers, addition of a new category requires entirely retraining the classifier, a problem that is avoided if each category has its own classifier.

RESULTS

Overview of Data

Table 1 provides descriptive statistics by industry sector for the two temporal categories –Current/Past orientation (CPO) and Future orientation (FO) as well as the measures of strategic orientation at the annual report level. The CPO values had means near one and were highly skewed, while the FO values had lower means and were closer to normal distributions.

Being the output of a factor analysis, the strategic orientations had approximately normal distributions. The numbers of annual reports analyzed increased each year (see top panel of Table 2) from relatively low numbers in the early years to a representative sample of the ASX in the later years. This reflects the content of *Connect 4,* which initially included only large firms but becomes more comprehensive over time.

Insert Table 1 about here

Insert Table 2 about here

Insert Table 3 about here

The significant negative correlation between FO and CPO (Table 3) suggests that, to some extent, they displace one other in discourse, but not in a zero sum process. The correlations between strategic focus and TOs lend some support to hypothesis 2a and 2b. However, the data structure has the form of repeat observations clustered by firms that are clustered by industry sector and a multilevel analysis is required to avoid underestimation of standard errors used in hypothesis tests (Rasbash et al., 2002). We used MLwiN (V1.1) to perform multilevel statistical tests and we deleted firms with only one or two annual reports to prevent them confounding the analysis (see lower panel in Table 2 for final case numbers).

Analysis of Temporal Orientation

Table 4 summarizes the output of the statistical tests performed. The simplest and most efficient analysis to test for a significant change in temporal orientations over time is a three level analysis with year observations nested by firm, which are nested by industry sector (Models 2 and 5 in Table 4). This is roughly the equivalent of an ANOVA as it apportions the variance between levels. For both temporal orientations, all three levels had significant

variance, which indicates that both temporal orientations varied significantly over time, even when variance attributable to firm and sector were taken into account.

We also examined the characteristics of the variance over time using a two level analysis (firm, sector) with period as an independent variable (Models 3 and 6 in Table 4) While less efficient statistically, this approach allows an analysis of the direction of change in temporal orientation over time. We tested for different slopes and intercepts at the industry sector level and, by comparing goodness of fit measures in the nested models, determined that the sector intercepts varied but not the slopes. For both temporal variables, the slopes were statistically significant but in the opposite direction to that proposed by short-termism: FO .04; CPO -.03. The analysis was repeated using only 1995-2005 data and produced similar results, which eliminated the possibility that the smaller number of cases in the early years were causing the result.

Insert Figure 3 about here

FO increased and CPO decreased over the sample period in all sectors as shown in Figure 2. The ranking of sectors' FO from highest to lowest was Telecommunications, Health, Energy, Information Technology, Utilities, materials, Consumer Staples, Industrials, Consumer Discretionary, and Financials. The top four sectors were well separated; the next five were bunched; while Financials were notably the lowest. The ranking for CPO from highest to lowest was Consumer Staples, Financials, Industrials, Utilities, Consumer Discretionary, Information Technology, Materials, Telecommunications, Energy, Health. The top eight sectors were close together; only the lower two sector were well separated. Overall, these results do not support Hypotheses 1a and 1b, which predicted a decline in FO and an increase in CPO. To gain some sense of the magnitude of the change, we compared the probability that a sentence in 1996 annual reports had an FO (CPO) with the probability in

2005. Over the ten years, FO increased considerably from .35 to .42, while CPO decreased marginally from .95 to .93. Using Theil's (1967) measure of inequality to compare the information content of the changes, the change in FO information was 2.8 times the change in CPO information.

Insert Table 4 about here

To test hypotheses 2a and 2b, we applied the three-level equations (used in Model 2 and Model 5) to the dataset with both the TOs and the strategic variables (see Model 7 and Model 11 in Table 4) and then added the two strategic variables, separately and together, to each model (see Models 8-10, 12-14 in Table 4). The sector, firm, and time period variances in the residuals of all models were significant, but the contribution of the sector level to variance in the residual was reduced by the influence of Innovation in all models and by the influence of Capacity Building for the CPO models. The direction of the slopes was as predicted by hypotheses 2a and 2b: Innovation and Capacity Building both had positive associations with FO and negative associations with CPO. Adding either or both strategic factors to the base models resulted in a significant improvement in the goodness of fit but, for FO, adding Capacity Building to Model 8, which already contained Innovation, did not produce a significant improvement in model fit. Duplicate tests using data from 1996-2004 produced similar results. In sum, hypotheses 2a and 2b are supported, but there is an interaction effect between Innovation, Capacity Building and FO.

DISCUSSION

The short-termism debate has persisted for at least three decades and has gained fresh impetus and currency both in the climate change debate and as a result of the recent financial crisis. To critics and supporters of contemporary business practice, short-termism represents a fundamental challenge to the appropriate allocation of commercial and more broadly societal

resources. However despite several decades of study, primarily by finance and economics researchers, conclusive evidence that short-termism is a problem, or is becoming a greater problem has yet to be produced.

Managerial and organizational cognition were the broad guides for this study that was shaped by Laverty's (1996) suggestion that short-termism be investigated more directly than it had been to date by studying how managers frame, interpret, and resolve problems of intertemporal choice. We measured the extent to which top-teams from a many medium to large ASX-listed firms focused on the Future and the Current/Past when explaining their decisions, actions and plans in annual reports over a 14 year period. The study examined changes in temporal orientation over time and different industry sectors as well as relating top-teams' temporal orientation to key aspects of their strategic focus. While we found evidence of a change in top-teams' temporal orientation over time, the direction of change contradicted expectations based on the assumption of increasing short-termism.

Our findings provide consistent evidence against increasing short-termism, at least among ASX-listed firms, over the period 1992-2005. Instead, they point to a widespread decrease in short-termism in two important respects – an increase in top-teams' orientation to the future when discussing key strategic concerns and objectives, and an associated focus on strategies concerned with enhancing longer-term capabilities and outcomes. While it is possible that short-termism was rampant in the early 1990s and, despite the decline remains too high in 2005, the increase in short-termism predicated upon increased institutional ownership is not evident.

While we earlier reviewed evidence against the view that managerial discourse in annual report is mainly impression management, some readers may nevertheless question whether top-teams reveal their 'real' temporal orientation in annual reports. If however, as is argued, short-termism is rewarded by institutional investors and top-teams impression manage their

temporal orientation in annual reports, we would expect to find that top-teams have increased their emphasis on the Current/Past and decreased it on the Future to suit the perceived preferences of dominant, institutional stakeholders. To maintain that our findings are a result of impression management would require the assumption that the vast majority of senior managers use annual reports to manage impressions among stakeholders who do not value short-termism, while using other means to communicate their 'real' short-term orientations to institutions. The existence of such sustained and widespread duplicity seems unlikely.

There are a number of potential explanations of why short-termism decreased over the period. The debate about short-termism may have sensitized top-teams so they increasingly employed a FO. The sample period was a time of sustained growth in the Australian economy, which may have encouraged top-teams to think more about future growth opportunities. Economists have long understood that investment by private firms is more likely when their managers are *inter alia* confident about future demand and prices (e.g. Bernanke, 1983; Shapiro, 1986) and it can be argued that temporal orientation, particularly FO, is an important indicator of top-teams' confidence about the future. It will be interesting to investigate if top-teams' FOs are affected by the current international financial crisis. A further observation is the relatively low FO and high C/PO of the Financial sector during a period of economic prosperity, which suggests that firms in that sector may focus on current performance when they are doing well and may direct attention to the future when their current performance is poor.

It is possible that the period of continuous economic growth that occurred during the study period has either attenuated or 'disguised' the effects of short-termism, which implies that once growth stops short-termism will again emerge, or that perhaps firms would have become even more Future oriented during this period were it not for the effects of short-termism. These are difficult propositions to test and they are certainly less parsimonious than

our interpretation of the findings. However they do point to more interesting and potentially fruitful avenues of future enquiry. It could be the case that, even though firms have actually focused more on the future, they have become more cautious over time in their readiness to allocate firms' resources on the basis of that increased FO. To answer these types of questions requires us to deal with broader issues of what influences investment behavior.

Given the centrality of private investment to capitalist economies it is not surprising that economics has devoted considerable attention to developing and testing models of firms' investment behavior (e.g. Clarke, 1979; Hayashi, 1982; Porterba, 1984). Management researchers have also shown considerable interest in a related issue – that of decision making in the context of risk, such as investment behavior (e.g. Hodgkinson & Healey, 2008; Neale, Tenbrunsel, Galvin & Bazerman, 2006). Whilst economic models have outlined some of the broad parameters influencing investment decisions it is generally agreed that they have proved to have limited ability to predict the "real world" investment decisions of organizations so that increasingly economics has begun to consider the psychology of the decision-maker in its attempts to explain investment behavior (e.g. Dixit, 1992; Pindyck, 1991. On the other hand, in the management literature there is a dearth of statistical studies that have dealt with how people behave when making actual business decisions, with research being dominated by laboratory studies (see Schwartz's (1994) review) and paper and pencil simulations outside of the lab (e.g. MacCrimmon and Wehrung, 1986). The measurement methodology we have adopted here provides the opportunity to integrate economic and behavioral theories by allowing us to measure cognitive variables over time in real world contexts and combine them with a variety of firm level and environmental-level economic variables (e.g. Kaplan, 2008) which means short-termism can be studied within a broader disciplinary and theoretical context.

Another distinct research challenge in relation to short-termism and one that may help explain reluctance by some to entertain the notion that these findings are valid is to examine the growth and influence of short-termism ideas from a framing perspective (Fiss & Hirsch, 2005). The concept of

framing captures the processes by which actors influence interpretations of reality among various audiences and is an inherently conflictual process as interested actors seek to articulate and influence different groups' understanding and interpretations of events. From a framing perspective short-termism represents a potential frame dispute which "represents society and culture as contested terrain and depicts various social groups as struggling for power" (Kellner, 1992: 58). A cognitive frame that assumes an underlying connection, in the form of short-termism between global financial crises, hedge funds and greedy investment bankers, oil shortages and SUVs, conspicuous consumption and growing income inequality, shrinking Amazonian rain forests and global warming may be quite resistant to disconfirming evidence consisting 'merely' of a demonstration of lack of short-term thinking about investment by senior managers.

This study of course has limitations. Additional analysis of performance outcomes is needed to test short-termism theory more thoroughly since it is the longer term performance consequences of short-termism that are seen as its most deleterious consequences. Data from the 1980s might provide evidence of increased short-termism and other nations also need to be examined. However, we have studied a considerable time period of 14 years across a large number of Australian firms and industries and there is no doubt that the level of institutional shareholdings in the firms we have studied, which is held to be a prime cause of short-termism (Jacobs, 1991), increased over the study period.

Finally the present study has a methodological contribution by measuring in natural text a central, cognitive construct – temporal orientation or perspective that "provides a foundation on which many more visible constructs are erected or embedded, such as achievement, goal setting, risk taking, sensation seeking, addiction, rumination, guilt, and more" (Zimbardo & Boyd, 1999: 1272). In conclusion, we believe that this study has contributed an important piece of evidence to a theoretically as well as practically significant issue and employed a method that can be used in the further study of this as well as other issues that require a combination of theoretical and methodological rigor with real world contexts.

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TABLE 1
Descriptive Statistics

	Sector*	N	Min.	Max.	Mean	SD	Skew	SE sk	Kurtosis	SE kt
Current/Past	1	843	0.658	1.000	0.952	0.042	-1.932	0.084	6.611	0.168
	2	375	0.820	1.000	0.955	0.032	-1.091	0.126	1.484	0.251
	3	342	0.671	1.000	0.910	0.058	-1.142	0.132	1.497	0.263
	4	1278	0.769	1.000	0.967	0.029	-1.522	0.068	4.378	0.137
	5	405	0.638	1.000	0.908	0.061	-0.909	0.121	0.781	0.242
	6	799	0.666	1.000	0.947	0.042	-1.538	0.086	4.489	0.173
	7	367	0.770	1.000	0.931	0.045	-0.790	0.127	0.531	0.254
	9	1413	0.716	1.000	0.935	0.049	-1.187	0.065	1.638	0.130
	9	79	0.787	1.000	0.912	0.048	-0.323	0.271	-0.331	0.535
	10	68	0.836	0.999	0.934	0.038	-0.460	0.291	-0.239	0.574
	All	5969	0.638	1.000	0.943	0.047	-1.476	0.032	3.081	0.063
Future	1	843	0.016	0.882	0.339	0.136	0.322	0.084	0.135	0.168
	2	375	0.025	0.684	0.352	0.121	0.134	0.126	-0.084	0.251
	3	342	0.012	0.920	0.462	0.136	0.071	0.132	0.286	0.263
	4	1278	0.000	0.758	0.280	0.128	0.243	0.068	-0.195	0.137
	5	405	0.142	0.929	0.492	0.135	0.035	0.121	-0.119	0.242
	6	799	0.000	0.790	0.379	0.140	0.047	0.086	-0.256	0.173
	7	367	0.070	0.773	0.473	0.128	-0.364	0.127	0.001	0.254
	9	1413	0.000	0.845	0.385	0.136	0.131	0.065	-0.089	0.130
	9	79	0.154	0.773	0.529	0.127	-0.677	0.271	0.676	0.535
	10	68	0.103	0.704	0.424	0.140	-0.262	0.291	-0.418	0.574
	All	5969	0.000	0.929	0.373	0.149	0.135	0.032	-0.259	0.063
Capacity Building	1	764	-2.328	2.207	*-0.459*	0.649	*0.562*	0.088	0.680	0.177
	2	345	-2.042	1.069	*-0.554*	0.524	*0.217*	0.131	0.287	0.262
	3	279	-0.978	3.624	*0.978*	0.775	*0.192*	0.146	0.173	0.291
	4	1190	-2.769	5.037	*-0.352*	0.701	*0.625*	0.071	3.575	0.142
	5	325	-1.755	5.23	*0.569*	1.264	*0.700*	0.135	0.205	0.270
	6	712	-2.972	2.545	*-0.333*	0.735	*0.525*	0.092	1.033	0.183
	7	307	-2.798	2.837	*-0.535*	0.873	*0.707*	0.139	1.079	0.277
	9	1190	-1.76	5.66	*0.746*	1.045	*0.407*	0.071	0.009	0.142
	9	66	-2.628	2.347	*-0.834*	0.972	*1.330*	0.295	2.034	0.582
	10	61	-1.415	2.536	*0.279*	0.897	*0.508*	0.306	-0.058	0.604
	All	5239	-5.660	2.972	-0.010	1.013	*0.861*	0.034	1.042	0.068
Innovation Expansion	1	764	-1.440	5.283	0.488	1.032	1.006	0.088	1.461	0.177
	2	345	-1.379	3.518	0.355	0.891	0.697	0.131	0.337	0.262
	3	279	-1.307	1.449	-0.508	0.450	0.975	0.146	1.607	0.291
	4	1190	-1.768	2.654	-0.441	0.630	0.762	0.071	0.993	0.142
	5	325	-1.403	4.572	1.394	1.173	0.235	0.135	-0.455	0.270
	6	712	-1.634	3.863	-0.033	0.764	0.909	0.092	1.472	0.183
	7	307	-1.400	4.634	1.001	1.028	0.612	0.139	0.540	0.277
	9	1190	-1.952	3.372	-0.542	0.634	1.294	0.071	3.450	0.142
	9	66	-0.925	2.586	0.825	0.756	-0.405	0.295	-0.163	0.582
	10	61	-1.356	1.732	-0.208	0.625	0.645	0.306	0.295	0.604
	All	5239	-1.952	5.283	-0.007	0.997	1.204	0.034	1.764	0.068

* Key to Sectors

1 = Consumer Discretionary, 2 = Consumer Staples, 3 = Energy, 4= Financials, 5 = Health, 6 = Industrials,
7 = Information Technology, 8 = Materials, 9 = Telecommunications, 10 = Utilities

TABLE 2
Number of Annual Reports by Year

Year	1992	1993	1994	1995	1996	1997	1998	1999
Temporal Orientation	67	191	212	346	371	376	401	373
Strategic Orientation	66	188	203	342	365	368	391	368

Year	2000	2001	2002	2003	2004	2005		All
Temporal Orientation	370	391	400	736	808	927		5969
Strategic Orientation	365	384	395	719	786	299		5239

Subset of firms with at least three reports								
Year	1992	1993	1994	1995	1996	1997	1998	1999
Temporal Orientation	60	156	192	289	335	349	361	337
Strategic Orientation	59	151	182	284	327	340	350	331

Year	2000	2001	2002	2003	2004	2005		All
Temporal Orientation	336	362	371	612	599	566		4925
Strategic Orientation	330	353	362	440	426	233		4168

TABLE 3
Correlations between Temporal and Strategic Orientations

	Current/Past	Future	Innovation Expansion
Future	-.69** (.01)		
Innovation Expansion	-.39** (.01)	.45** (.01)	
Capacity Building	-.33** (.01)	.20** (.01)	0.02 (.11)

** $p < .01$

TABLE 4
Results of Statistical Models

Model	Dependent Variable	Variance in Residual			βs of Independent Variables		-2LogLiklihood	p value difference from		
	N=4925	Sector	Firm	Period	Period			Model 1		
1	Future	.25* (.11)	.80** (.02)				12940.22			
2	Future	.24* (.11)	.43** (.02)	.41** (.01)			11266.19	.01		
3	Future	.23* (.10)	.78** (.02)		.04** (.01)		12815.65	.01		
	N=4925							Model 4		
4	Current/Past	.16* (.07)	.87** (.02)				13306.01			
5	Current/Past	.17* (.08)	.39** (.02)	.53** (.01)			12241.39	.01		
6	Current/Past	.15* (.07)	.86** (.02)		.03** (.01)		13257.65	.01		
	N=4168				Innovation	Capacity Building		Model 7	Model 8	Model 9
7	Future	.27* (.13)	.41** (.03)	.42** (.01)			9554.244			
8	Future	.18* (.09)	.28** (.02)	.34** (.01)	.51** (.02)		8568.618	.01		
9	Future	.27* (.13)	.40** (.03)	.42** (.01)		.08** (.02)	9536.863	.01		
10	Future	.18* (.08)	.28** (.02)	.34** (.01)	.51** (.02)	.01 (.02)	8567.862	.01	.39	.01
	N=4168				Innovation	Capacity Building		Model 11	Model 12	Model 13
11	Current/Past	.26** (.05)	.25** (.04)	.55** (.01)			10565.88			
12	Current/Past	.17* (.08)	.25** (.02)	.49** (.01)	.44** (.02)		9827.994	.01		
13	Current/Past	.18* (.07)	.30** (.02)	.54** (.01)		.18** (.02)	10318.31	.01		
14	Current/Past	.13* (.06)	.22** (.02)	.49** (.01)	.43** (.02)	.13** (.02)	9774.284	.01	.01	.01

*p <.05
** p < .01

FIGURE 1
Percentage of Specific Numeric Past and Future References 1992-2005

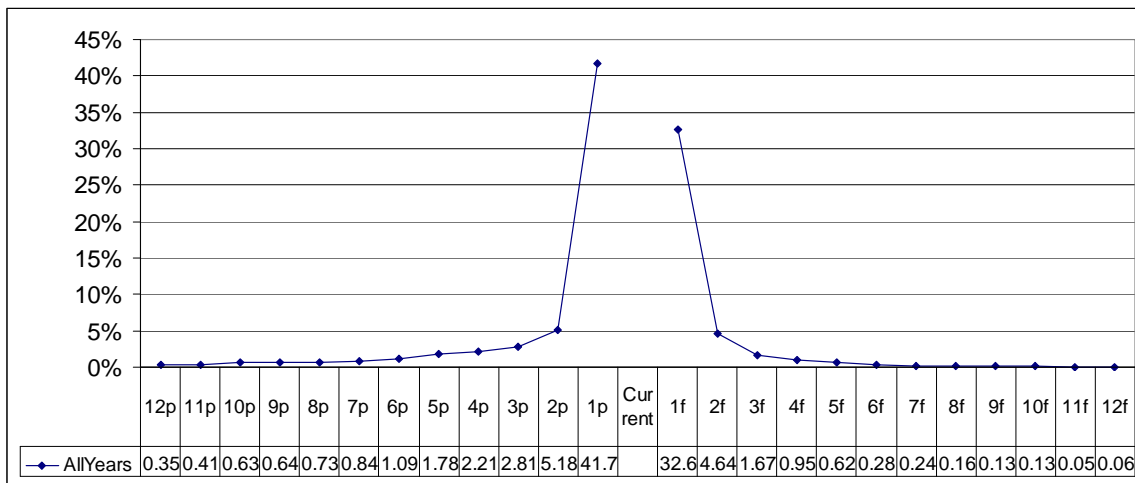|	12p	11p	10p	9p	8p	7p	6p	5p	4p	3p	2p	1p	Current	1f	2f	3f	4f	5f	6f	7f	8f	9f	10f	11f	12f
♦ AllYears	0.35	0.41	0.63	0.64	0.73	0.84	1.09	1.78	2.21	2.81	5.18	41.7		32.6	4.64	1.67	0.95	0.62	0.28	0.24	0.16	0.13	0.13	0.05	0.06

FIGURE 2
Distributions of Categories Assigned by Classifier Trained on Pure Numerical Single Temporal Category Sentences to Holdout Sets of Pure Numerical Single Temporal Category Sentences
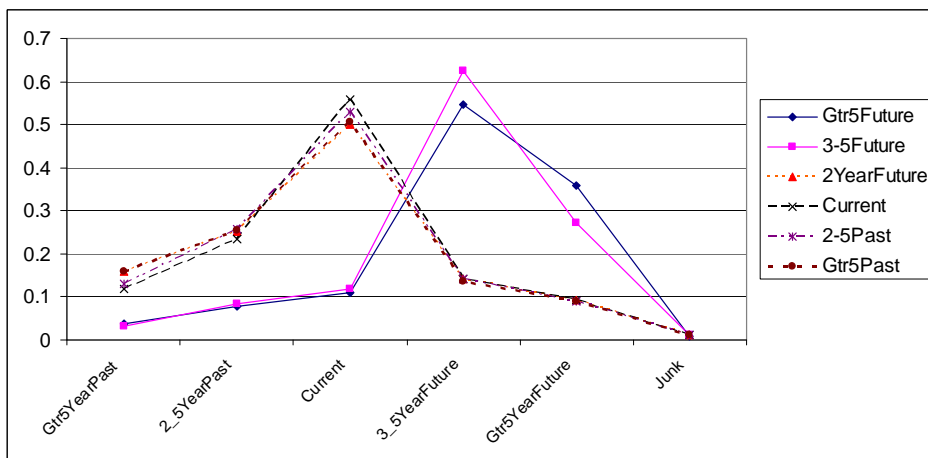
FIGURE 3
Different Sector Intercepts Show Different Sector Emphasis to Future and Current/Past

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