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THE OVERCONFIDENCE EFFECT AND IT PROFESSIONALS

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Abstract

Information Technology has become a core activity in most, if not all, corporations. Although IT managers continue to be under-represented in executive management, the very centrality of information technology to corporate success or failure suggests that this situation cannot endure. It has been suggested that information technology managers are too narrowly focused and technically oriented for strategic roles in the corporation. A key skill required of the executive relates to making decisions in situations imbued with uncertainty. This paper examines a cognitive process, the overconfidence effect, which has been shown to influence good decision making. An analysis is presented as to the susceptibility of IT professionals to the overconfidence effect when compared to accounting / finance and marketing professionals. The results suggest that information technology professionals are as good, if not better, at making complex decisions as professionals from the other two groups. Information technology professionals proved to be moderately overconfident, a situation which has some advantages as well is disadvantages. The study indicated that information technology professionals have the decision making skills to take their rightful place at the most senior levels in corporations.

Keywords: Overconfidence effect, decision making, IT management, heuristics.

1 INFORMATION TECHNOLOGY MANAGEMENT: IMPERATIVES FOR THE FUTURE

Information Technology has traditionally played a supporting role in corporate activities, failing to achieve the degree of centrality which is its due. (Wiseman, 1988). Things are changing, however. Within the new organisation, information technology finds itself in an increasingly central and critical role. It has moved from the role of automator through the role of enabler to fill a role at the very core of a corporation's activities. Information technology will play an increasingly integral role in corporate activities as people recognise that information is an economic entity, even a depreciating asset. (Johnson and Carrico, 1988; Robson, 1994; Marchand, 1997). Morton (1988) argues that companies must rethink their core business in terms of IT capabilities and potential and that information technology must be viewed from the vantage point of the organisation's entire strategic context rather than from a technical perspective. Choosing the right information technologies makes the difference between the organisation being a market leader or a follower and executives must be able to predict which information technologies are likely to have a major impact on their business (Remenyi and Sutherland, 1993).

Corporate procedures and plans for the acquisition, use and retention of information have become an important element in strategic planning. Although all managers will take on information-related responsibilities, IT professionals will play an important role in the formulation of an information strategy and in providing solutions to information-related problems. (Earl, 1997; Johnston and Carrico, 1988). They will have to learn that it is not technological sophistication or the amount of money spent on technology that counts, but how well information technology aligns with business goals. (Collins and Poras, 1995; 1997; Wiseman and MacMillan, 1987).

Robson (1994) examines some of the key factors which will determine the success of information technology departments in the coming decade. She believes that the tight integration of IT and corporate strategy is of great importance, arguing that a key feature of I.S. is the ability to accommodate rapid technological change. The challenge of the future lies in trying to 'connect the exploitation of I.T., which is in itself complex, rapidly changing and often not well understood by managers, to development of business strategies where neither the principles or methods are agreed .'

Information technology professionals will therefore require the ability to make informed decisions under conditions of uncertainty in the context of a rapidly changing, multi-faceted and unpredictable environment. This applies particularly to those whose responsibilities place them at the forefront of change - information technology managers. Rational decision making is however difficult in the dynamic modern environment. People consistently fall prey to decision errors of which they are usually oblivious (Simon, 1976). One of the most important of these is the overconfidence effect, whereby people are systematically overconfident about the outcomes of their decisions. This effect has been observed in experts and laypeople alike and can be a major impediment to sound decision making. (Clemen, 1990; Reichardt, 1992).

On the other hand, a management team that is perennially afflicted by self-doubt and fearful of making the difficult decisions is perhaps even more likely to fail than a systematically overconfident team. Indeed, it is likely that a degree of overconfidence in the decisions one has taken will eventuate in higher levels of commitment to the outcomes of the decision, a generally positive outlook and a corporate approach to decision making that favours action over vacillation.

Information Technology professionals would appear to be well prepared to take on a more central decision making role within the corporation. For decades, they have managed highly complex technologies, characterised by rapid and unpredictable change. But, are they able to adapt these skills to decision making in a less technical and more strategic decision environment and, more crucially, convince others that they are sufficiently capable to take their rightful place at the highest strategic levels of corporations? There is little doubt that IT managers are underrepresented within the ranks of

corporate executives and one of the reasons for this is likely to be the view that they do not have the necessary decision making skills (Stoner and Freeman, 1992; Robson, 1994; Wiseman, 1988). It is important that the IT profession actively seeks to dispel such notions.

This study explores the decision making skills of Information Technology managers when faced with a decision environment that is ambiguous and unpredictable. In particular, the performance of IT professionals is compared to that of professionals working in marketing and accounting. The goal of the study is not to make definitive statements but to provide an indication of the comparative performance of a small group of IT professionals working on a set of hypothetical scenarios. Because decision making is such a conceptually complex area subject to a wide range of influences, the study focuses on the overconfidence effect, a cognitive bias that has been shown to influence good decision making. It is hypothesised that resistance to this bias would indicate at least a potentiality towards sound decision making skills.

2   DECISION MAKING: THE KEY SKILL

Simon (1976) argued that management is decision making, and that the context of management is becoming increasingly uncertain and risky. Today, it is a fundamental premise of management theory that good managers require well-developed decision making skills and the ability to make sound 'judgment calls'. (Peters, 1993; Webber, 1997).

An important premise which underpins virtually all modern management writing is the fact that the internal and external environment of business have become much more complex than was the case just a couple of decades ago, and that the level of complexity is increasing exponentially. (Peters, 1993). Complex environments necessitate high quality decision making, and place enormous demands on the individual. Not all people are able to make good decisions under such circumstances. In fact, it is almost certain that people who cannot adapt to ambiguity will make poor decisions. (Smart and Vertinsky, 1984; Webber, 1997).

Webber (1997) refers to 'the vision thing.' He argues that many professionals today are so overwhelmed by the complexities of the task at hand that they struggle to make informed strategic decisions. They are unable to focus on issues unrelated to their area of expertise. He argues that future research is likely to indicate that individual differences determine decision making skill. Smart and Vertinsky (1984) examine the complex nature of the decision making skill and conclude that the ability to make good decisions is a variable of contextual elements and the psychological set of the individual making the decision.

Although individual differences have dominated the research to date, it would be useful to study industries and occupational groups. The underlying premise of this line of enquiry is that while individual interests and ability play an important role in the choice of occupation, the skills acquired in an occupational role or in a particular industry are equally important. For instance, people in certain occupations might be asked to make more decisions and be exposed to uncertain environments more frequently than others. These people might effectively learn to make good decisions and sound judgement calls.

The traditional decision making techniques which are still widely used in companies are based upon the rational model of planning, strategy and structure. (Stoner and Freeman, 1992). Simon (1976) challenged the rational model, and much of the subsequent research in the area is based upon his work. First of all, he argued, good decision making is impossible without high quality information. Also, in the modern environment, the problems facing the corporation are frequently not well defined. Much of the information required does not even relate to making the decision, but to defining the problem. To make matters more difficult, humans are not capable of thinking rationally, limited by skills, intellectual ability, knowledge, values, interests and a strong, unconscious irrational element in human behaviour. (Clemen, 1990; Hamel and Prahalad, 1994; Miller, 1992).

Simon argues that decision makers do not even attempt to deal with the complexity of the real world. They seek to construct a simplified model of the world based upon their values, knowledge and experiences. Central to this process is the use of heuristics, or subconscious mental rules of thumb which allow us to make some sense of novel, ambiguous and uncertain problems. These heuristics are essential to the decision making process because they give some structure to an incomprehensible and unfathomable environment. They are often what stands between making a decision or hesitating in uncertainty. Decision makers also do not always seek the best or optimal course of action. They satisfice, or settle for the first reasonable alternative which presents itself.

Walsh (1988) agrees with Simon that managers cannot cope with the complexities of the world without simplifying. He argues that managers routinely confront ill-structured, complex problems that challenge their cognitive and information-processing capacities. These belief structures (or heuristics) are indispensable because in their absence individuals would be overwhelmed by an information world of staggering complexity.

The work of Russo and Shoemaker (1990, 1991, 1992) suggests an important role for an overall heuristic called framing, where the decision maker structures the question in terms of a conceptual set, and where people use mental structures to simplify the world. People use these mental rules of thumb implicitly and subconsciously. Russo and Shoemaker argue that this process is both very useful and very dangerous. Everybody must construct mental frames of reference that simplify and structure the information encountered in an increasingly complex world. While this does allow them to make some sort of sense of a complex environment, it can lead to wildly inaccurate decisions. Often the partial view of the problem which the frame of reference encompasses precludes the identification of the correct course of action, literally forcing an incorrect decision. Alternatively, outdated rules of thumb may be used or a particular rule of thumb may be applied to an inappropriate situation. Frames therefore give much needed boundaries to a problem, but many people make poor decisions because they see them as inviolate. They also tend to draw narrow boundaries around problem areas. A good decision maker is always looking outside the boundaries, ready to extend his frame of reference. Russo and Shoemaker (1991) identify some of the more common decision errors:
- Plunging in, where information gathering and action begin immediately, without first thinking about the crux of the issues which are being addressed.
- Frame blindness (framing), where mental frameworks make people oblivious or resistant to key information and closes them off from many viable courses of action.
- Overconfidence, which often causes people to fail to collect key factual information because they rely too much on their assumptions and opinions.
- Shooting from the hip - people mistakenly believe that they can keep track of all the information they have collected and fail to adopt systematic choice procedures.
- Group Failure - assuming that a group of clever people cannot make poor decisions.

This study focuses on a particular heuristic - the overconfidence effect. Russo and Shoemaker (1990) argue that the overconfidence is one of the most important heuristics in the modern managerial context, and that the phenomenon can cause many organisational problems. They argue that not only are managers themselves overconfident, but they are also bombarded with information from other people who are also overconfident and whose judgements are prone to error - proposals, predictions, estimates and so on. A particularly insidious side-effect of overconfidence is the confirmation bias. Because information which challenges our opinion would cause a degree of cognitive dissonance, we seek out confirmatory information. Russo and Shoemaker argue that overconfidence has been a hidden flaw in managerial decision making for many years and are of the opinion that the best decisions are made by those (few) people who possess metaknowledge, which is the ability to understand and appreciate the limits of one's knowledge.

Overconfidence is not a phenomenon associated with laypeople alone. Studies have found that experts are often highly overconfident, sometimes about issues far removed from their field of expertise. (Bradley, 1981; Freudenberg, 1988; Lichtenstein and Fischhoff, 1977 and 1982). Bradley (1981)

found that experts can be highly unreliable. When faced with questions which were too difficult to answer, they would rather guess the answer than admit ignorance. Furthermore, they then expressed high degrees of confidence in their guesses. This tendency is exacerbated by the degree of perceived expertise. Experts can thus be at their most fallible when we need them most - that is, when the decision is very tricky. Freudenburg (1988) concedes that even scientists, who should be the most rational of all, fail to foresee all factors which can introduce error into judgements, especially when systems are complex and components related in unpredictable ways. They often also have excessive confidence in their estimates.

Although the vast majority of studies on the overconfidence effect have focused on individuals, some studies have looked at industries and occupational groupings. The work of Russo and Shoemaker (1992) suggests here is evidence that people who work in certain professions have a higher degree of metaknowledge and are less prone to overconfidence than others. For example, they found that geologists, accountants and weather forecasters have a degree of resistance to conceptual bias, including overconfidence. Tomassini (1982) found that when experienced auditors provided estimates and confidence ranges for account balances, they were under confident rather than overconfident. He suggests that accountants may have learned to compensate for overconfidence because they spend so much of their time detecting fraud and error, and that the accounting profession is valued for its conservatism.

Mahajan (1992) examined the marketing profession. He argues that estimating the likely occurrence of future events has become a critical aspect of a marketing manager's role as a strategic decision maker. Should not people working in the dynamic, fluid and uncertain environment of marketing handle overconfidence better than most? Although there are a growing number of analytical techniques which help managers cope with uncertainty, such as cost-benefit and decision tree analysis, Mahajan found that these played only a minor role in reducing the impact of biased decision making and that marketing managers are susceptible to the overconfidence effect. He found that overconfidence was not a random phenomenon, but appeared consistently and systematically. More important, those managers who are the most confident are also the most likely to act upon their decisions and commit resources without considering additional information.

3   RESEARCH METHODOLOGY

This study compares the ability to make predictions and expressed level of confidence in those predictions of information technology professionals and managers to that of marketing and accounting / finance professionals and managers. Previous research (discussed above) suggests that accountants are relatively well calibrated in terms of the level of confidence they have in their decisions while marketing professionals are likely to be overconfident.

The study addresses the following questions:

1. Are information technology professionals more accurate at making judgement calls and predictions under conditions of uncertainty when compared to accounting and marketing professionals ?

2 Are information technology professionals overconfident in their judgement calls and predictions when compared to accounting and marketing professionals ?

3. Are information technology professionals overconfident in their judgements when their response accuracy rates are taken into account ? That is, are their levels of confidence significantly higher than their accuracy levels. An important term in this context is calibration, which refers to the degree of concurrence between accuracy level and confidence level. Thus, when a person is well calibrated there is a significant correlation between accuracy rates and confidence levels. The overconfidence effect will, of course, always involve poor calibration, as there is by definition a significant discontinuity between accuracy levels and confidence levels.

The overall methodology used is based upon the studies of Dunning and Griffin (1990), Kahneman and Tversky (1974), Klein and Kunda (1994), Mahajan (1992), and Russo and Shoemaker (1992, 1993). The study used a single questionnaire comprising of three scenarios, each depicting a situation of uncertainty. These scenarios were developed specifically for this study. The first scenario introduces a complex futures trading decision with attendant climatic and environmental uncertainties. The second scenario involves making a number of decisions / predictions concerning the establishment of a greenfield enterprise. The third scenario involves making a number of decisions / predictions relating to the usage of a technology which has many benefits but also some potentially serious risks. Participants were asked to answer question based upon each situation and then, on a five-point scale, express a level of confidence in their answers. They were allowed 30 minutes to complete the task, which introduced a time constraint. They were allowed to use a pen and paper but not a calculator. Each question had a correct answer so that accuracy could be assessed objectively. The complexity of the scenarios, the number of questions involved and the limited amount of time available made it highly unlikely that participants would have sufficient time to rationally assess the implications of each scenario.

All the respondents were IT professionals, accounting / finance professionals or marketing professionals. Approximately half of the respondents hold positions in middle management or higher. The design of the study guarantees anonymity for all respondents. The respondents were drawn from groups to which the researcher has access, as follows:

- Members of staff in the IT and finance departments working in a large bank .
- University students in full-time employment.

It is important to realise that no instrument of this nature is capable of replicating a real decision environment. Indeed, the questions do not deal with decisions per se, but with the type of judgement calls which are frequently a contextual element of decision making. Even when a scenario which requires a decision is presented, that decision is highly artificial and has no tangible consequences. Virtually all previous studies have, however, relied upon these types of questionnaires.

3.1 Hypotheses

The study formally tests the following hypotheses:

1. The level of confidence in the accuracy of predictions is not significantly different between information technology professionals and accounting / finance professionals.

2. The level of confidence in the accuracy of predictions is not significantly different between information technology professionals and marketing professionals.

3. There is no relationship between accuracy of prediction and the level of confidence in prediction.

3.2 Methodological constraints

This research report is not in any way intended to be definitive. The test statistic and analytical methodology employed should be evaluated with regard to the following potential problems:

A. Sample Size

The sample size is relatively small.

B. Potential Sampling Bias

The respondents in this study were not randomly selected. They selected themselves in that they belonged to groups readily available to the researcher. It is possible that a small number of respondents significantly skewed the distribution of scores.

C. Control

The questionnaire is fairly difficult and somewhat time-consuming. It was relatively difficult to persuade some people to participate. It is therefore possible that some respondents became tired or were not sufficiently interested to begin with.

4 RESULTS

The questionnaire was administered to 31 accounting / finance professionals, 31 information technology professionals and 31 marketing professionals. Where more than 31 people volunteered from a particular profession, the numbers were reduced via random selection. The majority of the respondents hold positions in senior and middle management, and no respondent has less than three years professional experience. All respondents were timed and the questionnaires were administered under the supervision of the researcher. The data was analysed using SPSS.

The results were as follows:

Hypothesis 1: (The level of confidence in the accuracy of predictions is not significantly different between information technology professionals and accounting / finance professionals.)

An analysis of the data indicates that the null hypothesis should be rejected at the 0.05 level of significance. Indeed, at the .003 level of significance (two-tailed) the null hypothesis is rejected. The results therefore suggest that there is a significant difference in the level of confidence between IT professionals and accounting professionals. IT professionals, with a mean level of confidence of 3.4184 on a five-point scale, exhibit a significantly higher level of confidence in their predictions than accounting professionals, with a mean confidence score of 2.8458. Of note, at the 0.05 level of significance there was no difference between the two groups as regards the accuracy of prediction.

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	Df	Sig. (2-tailed)		
CONF	Equal variances assumed	.612	.437	3.051	60	.003		
	Equal variances not assumed			3.051	59.339	.003		

Table 1.   Confidence in Prediction: IT versus Accounting group

Hypothesis 2: The level of confidence in the accuracy of predictions is not significantly different between information technology professionals and marketing professionals.

An analysis of the data indicates that the null hypothesis should be rejected at the 0.05 level of significance. Indeed, at the .011 level of significance (two-tailed) the null hypothesis is rejected. The results therefore suggest that there is a significant difference in the level of confidence in between IT professionals and marketing professionals. IT professionals, with a mean level of confidence of 3.4184 on a five-point scale, exhibit a significantly lower level of confidence in their predictions than marketing professionals, with a mean confidence score of 3.8555. At the 0.05 level of significance

there was also a difference between the two groups as regards the accuracy of prediction. Of particular interest is the fact that the IT group had a significantly higher level of overall accuracy.

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	T	Df	Sig. (2-tailed)		
CONF	Equal variances assumed	.657	.421	-2.639	60	.011		
	Equal variances not assumed			-2.639	58.719	.011		

Table 2.   Confidence in Prediction: IT versus Marketing group

Hypothesis 3: (There is no relationship between accuracy of prediction and the level of confidence in prediction.)

An analysis of the data indicates that, for the IT group, there is a significant positive correlation between accuracy of prediction and the level of confidence exhibited in that prediction. By comparison with the correlation of .371 for IT professionals, accounting professionals did not exhibit a significant relationship (with a correlation of -.031). Although marketing professionals did not attain significantly different levels of accuracy when compared to the other groups, their higher levels of confidence resulted in a significant negative correlation between accuracy and confidence (-.289).

		ACC	CONF
ACC	Pearson Correlation	1	.371(*)
	Sig. (2-tailed)	.	.040
	N	31	31
CONF	Pearson Correlation	.371(*)	1
	Sig. (2-tailed)	.040	.
	N	31	31

Table 3.   Correlation between confidence and accuracy in prediction for IT group

* Correlation is significant at the 0.05 level (2-tailed).

5   DISCUSSION AND CONCLUSIONS

Information technology professionals are not yet reaching the executive levels of corporations in sufficient numbers, especially given the core importance of IT to most corporations. Accounting and finance professionals continue to be strongly represented within the ranks of corporate executives and,

particularly in the last decade, professionals from areas such as marketing and core line areas have gained significant ground. There is little doubt that there are those who view IT managers as narrowly focused 'tecchies' who do not have the breadth of knowledge or decision making skills to succeed at the executive level.

The information systems professionals who participated in this study were something of a revelation. They were more accurate in making judgements about decision environments imbued with uncertainty than the other groups and their levels of confidence in their judgment calls were surprisingly well calibrated.

The results of the study support previous work with accounting and marketing professionals. Those involved in accounting exhibited a balanced, even conservative view of their own decision making capabilities, the group as a whole scoring very near the boundary between over / under confidence. Marketing professionals, on the other hand, were systematically and significantly overconfident. At the same time, their predictions were the least accurate of the three groups, although this may be due to the fact that the scenarios were more alien to them than to the other groups.

The IT professionals were substantially overconfident in their own judgements under conditions of uncertainty but a significant proportion of this overconfidence was accounted for by actual performance. In effect, they were saying: 'We are good at this.' – and they were! It must be conceded that the level of confidence was somewhat higher than the level of performance but this may not be a bad thing. As was mentioned above, high levels of overconfidence are likely to have many adverse consequences but a modest level of overconfidence can actually be beneficial for performance and future decision making. The moderately overconfident person is more likely to take the well measured and balanced risks required of so many key entrepreneurial decisions and to feel positive about the outcomes.

A number of issues should be addressed before any conclusions are made about a study of this nature:
- The study uses artificial decision environments. Behaviour could differ significantly if the decisions was real.
- Unknown conceptual processes may be at work.
- It was sometimes difficult to sustain interest and concentration.
- It is difficult to validate the questions.
- There are very few applied studies to use as a resource.
- Very little work has been done to establish exactly what happens after overconfident decisions are made.
- In this study, the IT group in particular was drawn from a relatively narrow base in terms of previous experience and industry type.

With due regard to the constraints mentioned the study indicates that IT professionals are moderately susceptible to the overconfidence heuristic. It would appear that information technology professionals have a degree of tolerance for ambiguity and uncertainty, and are capable of making reasonable judgements calls, more so when the key skills required by the decision situation are intuitive in nature (rather than logical). On a comparative basis, the IT professionals fared best in the area of metaknowledge.

This study suggests that IT professionals have the potential and capability to be effective decision makers and executives. Although susceptible to some conceptual biases, they did perform at least as well overall as representatives from two occupational groups which account for the majority of CEO's in many major corporations. This lends support to the contention that IT professionals are ready to take on roles with greater strategic responsibility.

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