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Are we any closer to the end? Escalation and the case of Taurus*

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The collapse of project Taurus, a £500 million IT venture commissioned by the London Stock Exchange, ranks as one of the major fiascos of business history. This paper examines key events in the design and construction of Taurus with reference escalation theory. Escalation theory concerns the tendency of organizations to become trapped in failing projects like Taurus and to persist with them irrationally. Two features of escalation and subsequent failure are highlighted. First, the destructive progression whereby one sub optimal decision forces another. Second, a process of means/ends reversal whereby a pre-occupation with delivering Taurus obscures the reality that Taurus is no longer worth delivering. © 1998 Elsevier Science Ltd and IPMA. All rights reserved

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“Are we any closer to the end?” “We-ll not really...” (a member, Taurus monitoring group.)

On Wednesday 11 March 1993, the City of London was shocked by the sudden cancellation of project Taurus. Collectively the City had invested 5 years and almost £500 million on the venture.[†] Ostensibly the Stock Exchange had set about the project correctly. There was extensive user consultation. Taurus was supported by the entire securities industry and the Bank of England. The design and building was supervised by a series of influential City-wide committees. The Stock Exchange convened a powerful team of software engineers and appointed one of the most respected project directors in the UK to lead them. How could Taurus have failed?

In retrospect the risks were obvious. Taurus was a highly complex project, involving novel technology and an ambitious timescale for which no protocols existed. It was set to over-turn the trading and regulatory framework of the entire securities industry. Yet when the prospectus was published in early 1990, few predicted that Taurus was destined never to appear.

The present study centres upon three questions, namely:

1. Why did the Stock Exchange embark upon a project which was allegedly fundamentally flawed from the start?

2. Why did the project team compound the difficulties by disregarding the best practice techniques in building Taurus?
3. Why did the Stock Exchange persist with Taurus until 1993 when it was clear by mid-1991 that the venture had failed?

The background to Taurus and the role of the project team are described later in this paper. (For details of the research method see Appendix 1.) Here it is sufficient to note that the media cited poor project management as a major reason for collapse (e.g. Waters and Cane¹). Although mistakes were made, it will be argued that this diagnosis obscures deeper forces which undermined Taurus hiding the inevitability of failure.

Theoretical context

The theoretical context of the present study is grounded in the literature upon escalation in decision making. Escalation theory seeks to explain why organizations embark upon questionable ventures and then persist with them well beyond an economically defensible point.^{2–6}

Broadly speaking there are two theories of escalation. Decision dilemma theorists point to information poverty.^{7–10} The argument is that even the most meticulously researched projects invariably involve guesswork. It is impossible to predict exactly how a venture will turn out. Feedback is usually equivocal and may be patchy especially in the early stages. Moreover, it may be sensible to persist despite difficulties in order to give the venture a chance to work.⁷ Decision dilemma theorists suggest that a concomitant relation-

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[†]The Stock Exchange spent over £80 million on Taurus. Firms in the City of London spent an estimated £400 million developing their own systems in preparation for Taurus.

ship exists between the decision maker's information and their commitment to the venture. The theory predicts that negative feedback diminishes commitment and unequivocal evidence that expectations are futile finally destroys it.

Social-psychological theorists argue that decision makers seldom respond so rationally to the costs/benefits structure of their environments. They suggest that persistence is driven by a desire to avoid the social and psychological costs of failure.¹¹⁻¹⁴ In an influential review of the literature Brockner¹² concluded that personal responsibility for an unsuccessful decision is powerfully conducive to escalation. Unwillingness to appear foolish in the eyes of significant others may also prompt foolhardy persistence.^{2,14}

Whereas decision dilemma theorists suggest that escalation is caused by insufficient data, social psychological theorists argue that escalation is facilitated by the biased manner in which decision makers approach their information. They suggest that decision makers actively seek out information which supports their point of view whilst under-playing or even ignoring disconfirming data.^{6,15} Such biased processing may enable decision makers to erroneously convince themselves that things are not as bad as they seem, that the problems are temporary, and, that success is imminent.

Escalation theory and Taurus

In essence decision dilemma theorists view persistence as a rational response to difficult circumstances. Social psychological theorists see it as an irrational reaction to failure.

Relating these theories to the present study, Taurus was originally due to have been implemented in October 1991. Yet by October 1991 the timetable had slipped one hundred per cent and the £50 million budget was spent. Moreover, it was obvious that the legal, security and technical requirements were much more intricate than had been foreseen. It was clear, therefore, that expectations could not be met. Yet construction continued for almost another 2 years before the project was finally cancelled.

This suggests that persistence cannot be explained by information poverty. Does this mean that escalation was irrational, driven by fear of failure, or is there some other explanation? What follows is an attempt to explore these questions.

The case study

The background to Taurus

First it is necessary to explain the background to Taurus. Buying and selling shares (also known as securities) involves two processes, dealing and settlement. A trade is dealt when a broker contracts to buy or sell shares for a client at a specific price. Once a trade is dealt it must be settled. Settlement involves arranging the transfer of money and shares, amending the company's register of shareholders and either issuing and/or cancelling a share certificate.

London's settlement procedures date from the eighteenth century when trades were toasted over a glass of sherry.⁶ In 1987 the antiquated paper driven system almost collapsed under the sheer volume of trades

resulting from a rising market.⁷ Taurus was intended to provide London with a 'state of the art' system of electronic transmission which would enable the securities industry to eliminate paper from the system, known as de-materialisation, thus paving the way to streamlining settlement.

The Stock Exchange began designing Taurus in early 1988. The aim was to create a simple system for the large investment houses who account for over 70% of the value of transactions on the London Stock Exchange. Taurus 1 as it became known could have been built in 6 months using tried and tested technology.

The retail broking constituency who account for approximately 70% of the volume of trades objected to Taurus 1 because it placed them at a commercial disadvantage. The Bank of England then suggested that Taurus should be built without seriously harming any business interest. Accordingly, a City-wide committee was convened to devise a system which would satisfy everyone. The securities industry is extremely diverse, consisting of banks, brokers, company registrars, international custodians and so on. Every constituency wanted something different. The design phase was scheduled to occupy 2 months. Two years later, however, the industry was still locked in conflict:

There were at least thirty committees connected with Taurus ... They were springing up all over the City ... The committee of London clearing bankers had a committee on Taurus, so did the registrars, so did Snoops, and Jones. You add them up and everybody was giving input to Taurus. (Interview, Peter Rawlins, October 1993)

In mid-1989 John Watson was seconded from the consultancy firm Coopers and Lybrand to direct the project. He was well qualified for the task having previously served as deputy chief executive of the Stock Exchange, and having led the successful Talisman IT project, the precursor to Taurus. John Watson was highly respected in the City and by those who worked for him. One subordinate said,

John was a saviour. If anyone could sort this business out and deliver Taurus, it was him. (Interview, member of the Taurus project team, May 1994)

Watson's first act was to finalise a compromise solution which the committee had been considering. The compromise involved a hybrid design comprising no fewer than 17 alternative versions of Taurus welded together to reflect existing business practice. 'Complex but do able' pronounced the project team. 'A sign of troubled times to come', commented the financial press.⁸

'I did try to stop it and could not stop it'. 'Do-able' maybe, but was Taurus worth doing? Peter Rawlins the newly appointed chief executive had his doubts:

It was obvious to me that it was not the right thing to do. It wasn't the wrong thing to do... It just struck me it was an unholy compromise. It struck me that the original simple concept was being emasculated... it was going to be unnecessarily complicated... unnecessarily time consuming and much more expensive than it need be and, above all else, I thought it would not deliver

the promised benefits (Interview, Peter Rawlins, October 1993)

Rawlins was instructed not to interfere. 'Don't touch it please. Just let that happen.' (Interview, Peter Rawlins, October 1993). Besides, events were already over-taking the chief executive:

There was a full-time partner of Coopers overseeing the project. Funds had been voted, budgets had been set, the parameters were away, we had monitoring committees, Christ knows what. I fought my corner for a while and thought "Fine, if you are all happy with this that's fine. Lets get on." (Interview, Peter Rawlins, October 1993)

'It used to drive us crazy'. The securities industry insisted upon an 18 month timescale for Taurus. It was an ambitious target to say the least. In order to make rapid progress and to maintain the industry's commitment, the project director decided to construct the outwards part of the system first leaving the central architecture until last.

Once the securities industry began to see what Taurus might look like the complexity grew exponentially as they began demanding changes. The project team were constantly forced to repeat work as requirements changed repeatedly:

More records came in, some went out, things on record changed, the description of what that record was used for might grow. That process happened too many times... It used to drive us crazy. (Interview, member of Stock Exchange project team, May 1994)

It was originally anticipated that the legislation required to operate Taurus would involve only a few pages of mechanics. It became clear, however, that if share certificates were abolished investors could no longer own shares directly. The lawyers solved this problem by creating a new concept known as entitlement to shares. Entitlement proved to a difficult concept to systematise. The project team grappled with the challenge. They thought they understood the requirements. Only later would it emerge that the legal intricacies of Taurus had defeated them.¹⁹

Another crucial decision taken in order to shorten the development cycle was to utilise a software package known as Vista to drive the system instead of building from scratch. Vista is a good package but it was never designed for UK settlement procedures. It was chosen because it was the closest match available. The budget for tailoring the software was £4 million though at Vista's insistence the contract was on a 'time and materials' basis. When the project collapsed expenditure upon re-engineering Vista had already exceeded £14 million and the work was still far from complete. The constantly changing requirements exacerbated the difficulties. Unsurprisingly, parts of the system built by Vista in the USA sometimes failed to match the parts built in the UK. A project manager recalls, 'It was like one of those toys you bash with a hammer. You bash one peg down another one flies up at you. Bash that peg down again, another one flies up!' (Interview, member of Stock Exchange project team, May 1994).

'Its brilliant! and daft!'. Taurus should have been implemented in October 1991. Following a series of public postponements during early 1991, however, signals that Taurus was in difficulties began to appear. The chief executive commissioned Coopers and Lybrand to review whether the Taurus was still feasible. The review indicated that the earliest possible date for completion was April 1993.

The chief executive's subsequent decision to recommend continuance prompted a frosty response from the Board (formerly the Council) of the Stock Exchange. Was the chief executive satisfied that the new budgets and timescales were realistic? The chief executive replied that provided the various assurances he had received from the government and major suppliers were correct, then he was satisfied. But, he added, 'Big provisos'. (Interview, Peter Rawlins, October 1993).

With that caveat, the Board accepted the chief executive's recommendation.

A year later, in October 1992, there was still no sign of Taurus emerging. By now the industry-wide group responsible for monitoring Taurus had become extremely concerned, 'There was always another piece of work. There was always another dimension that was going to be investigated', said a member of the group (Interview, member of Taurus monitoring group, June 1994).

In an effort to control Taurus, the monitoring group began to demand more information. Henceforth the project managers were required to submit report sheets indicating progress since last meeting, issues open, plans for next month and so forth. The exercise proved futile:

You'd say, "How many of these issues have you resolved?" And they would say, "We have resolved all of them." And there was another page that was 'risks', "What risks are you running?" There was a long list of risks... every meeting they'd come with this chart and they would say 'We have resolved all these issues, and now we have got another set of issues...' So there was lots of progress. Every meeting lots of progress from where you were in the last meeting. However, when you sat back and said, "Are we any closer to the end?" "Well, not really..." And that was really what was happening... You knew people were working hard and they were getting work completed and putting it behind them and then they discovered there was a whole set of other things. (Interview, member of the Taurus monitoring group, June 1994)

Against this backcloth, the project team's habitual optimism was beginning to ring hollow. 'They couldn't believe that it wouldn't work. They believed they knew how to make it work but it would just take longer and would cost a bit more,' said a member of the monitoring group (Interview, member of the Taurus monitoring group, July 1994).

As they began to look back over the past 3 years the monitoring group finally said to one another, 'We don't think we are any closer to the end' (Interview, member of the Taurus monitoring group, June 1994).

The chief executive shared the monitoring group's concerns, 'I had had enough two years on of people telling me, "Don't worry Peter. It will be with us soon."' (Interview, Peter Rawlins, October 1993).

Rawlins began to investigate. He was shocked by what he found. The decision concerning the central architecture had been taken openly. The chief executive now realised that it was like trying to construct a house by digging the foundations last.¹

Time, moreover, had overtaken the project as the chief executive recalls:

'There were God knows how many fatal flaws about the whole Taurus technical design, but one of them, one of many of them, was that they decided it was easier to build it around Talisman... So the core of Taurus would have been Talisman. Talisman has been in place since 1979. Disaster! It was the right decision at the time. It was taken because they thought they would try and get the whole thing done in seven months and they thought, "Let's not bother to change Talisman. We'll get round to changing it in due course"' (Interview, Peter Rawlins, October 1993).

The decision to link Taurus to the Stock Exchange's existing Talisman system meant that the 'real time' Vista package had to be converted to batch processing:

Let's do it quick and cheerful... so, on line system. On line? The boys had been spending two years bugging about with it to make it a batch system so that it was compatible with 1970s technology. Its brilliant! And daft! (Interview, Peter Rawlins, London Stock Exchange, October 1993).

Meanwhile the project team had been using a central simulation harness to test the system. Whereas people in the market may have thought they were linking with a real working computer, there was actually nothing in the middle. 'Very sexy,' remarked the chief executive. 'I had rocket scientists working for me' (Interview, Peter Rawlins, October 1993).

The chief executive concluded that Taurus would take another 3 years to finish. Moreover, no guarantees existed that the central architecture would match completed work. Those two factors convinced the chief executive that Taurus should be cancelled.

Many of the staff wept when they heard the news. One individual who had been working 80 h/week in an effort to deliver the project said afterwards, 'That's the sadness that's left. We did so much that was good. Then it got wiped out in a day.' (Interview, member of project team, May 1994).

Analysis and discussion

What can the case of Taurus teach us about escalation and decision-making? Recall that decision dilemma theorists suggest that escalation is a function of information poverty whereas social-psychological theorists suggest that it is ego-defensive.

The present study suggests that both perspectives are relevant to explaining escalation. The Board's decision in mid-1991 to approve new budgets and timescales can be interpreted as an attempt to give the project one last chance to work. Arguably this decision was logically given the Board's information, the amount invested in the project and the level of the expected pay-off.²⁰

The project team's reluctance to acknowledge the scale of the difficulties suggests that they were influ-

enced by information processing biases. Moreover, the approbation accorded to John Watson may have influenced his determination to deliver Taurus.

Power, politics and responsibility

More important is what the present study reveals that is new about escalation. Neither theoretical perspective fully explains how the Stock Exchange came to embark upon such a questionable venture or why the decision makers revised their expectations in 1991 in order to allow Taurus to continue.

A striking feature of escalation in the present study is the imbalance between power and responsibility. Recall that personal responsibility for the failure may be powerfully conducive to escalation.^{12,13} The present study suggests that the opposite is also a plausible possibility. Although the Stock Exchange had ultimate responsibility for Taurus, the organization was insufficiently powerful to prevent the securities industry from interfering with the design. Moreover, the chief executive who resigned when Taurus collapsed, was unable to halt the project. Conversely, those least accountable for Taurus, banks brokers and so forth, had the greatest power to influence it. That influence undermined Taurus because it led to a complex design and an overly ambitious timescale.

It is not suggested that this influence was deliberately destructive. There are many instances in the management literature where political considerations override technical rationality in organizations (e.g. Ref. 21). This is precisely what happened with the Taurus design. It was not the best solution that was adopted but the 'least worst'.

There may have been another escalatory factor at work besides the pursuit of vested interest. Kahneman and Tversky²² suggest that where change occurs gradually people lose sight of the absolute magnitude of the transformation. In the case of Taurus many of the changes made to the design were fairly minor in themselves. It was their cumulative impact which was significant. The result was a form of 'stack up' whereby one small change in a complex system triggers a larger and unpredictable reaction elsewhere in the system and so on.²³ This explains the perpetual frustration of solving one problem only to discover a whole host of others.

The irony of escalation

How can the mistakes made in the building of Taurus be explained? That best practice techniques were discarded might suggest incompetence. The present study points to a more subtle explanation. Rationality may be defined as the calculation of the most appropriate means of achieving an objective.²⁴ The project team calculated that the only possibility of meeting the timescales lay in building the outward parts of the system first and in utilising a software package. In other words, the present study exemplifies the so-called 'paradox of consequences'²⁴ or what Ritzer²⁵ calls "the irrationality of rationality" whereby the project team's ingenuity becomes dedicated to solving problems which should not have existed in the first place. A feature of this process is a means/ends reversal whereby the available means, that is, the Vista software pack-

age, is made to fit the ends. This phenomenon is sometimes known as the 'garbage can effect' whereby the solution dictates the problem.²⁶

There follows an escalatory spiral whereby one sub-optimal decision forces another sub-optimal decision and so on. This process explains many apparently bizarre decisions, converting a 'real time' system into batch technology, for example. It is absurd and yet entirely logical, brilliant and daft.

Taurus shows how time itself may ultimately undermine projects.^{20, 21} Decisions which were correct at t1 'lets not bother to change Talisman' are insupportable but impossible to reverse at t2, 'Disaster!'.

Managerial control mechanisms

Such difficulties might have been identified sooner but for weaknesses in the Stock Exchange's control mechanisms. The 'division of labour' meant that only the project director had a complete picture of Taurus. Yet John Watson only became aware of the full extent of the difficulties in November 1992, shortly before he was moved by the chief executive into another role. Two factors prevented John Watson from exercising the level of supervision which he would have wished. Firstly, in 1991 the government ruled out compulsory membership of Taurus. Consequently a disproportionate amount of Watson's time was consumed in public relations exercises aimed at persuading listed companies to join Taurus. Secondly, the chief executive altered the project's management structure by creating separate marketing, legal and public relations departments for Taurus. This development was designed to give the chief executive more control over Taurus. An un-intended consequence, however, was to force the project director to spend time in liaison activities at the expense of managing the building of Taurus.

The management of the interface between the Vista and the Stock Exchange was inadequate. At one stage there were four groups of staff each giving different instructions to Vista. The chief executive was distracted by other urgent priorities for most of the period. The monitoring group met only once a month for an hour and a half. The relatively authoritarian culture of the Stock Exchange did not encourage a free flow of information. For example, few executives practised 'management by walking around'. Another unhelpful factor may have been the proportion of consultants employed on the project. Approximately two-thirds of the total workforce were seconded from Coopers and Lybrands.

Escalation and 'first order' thinking

The over-arching escalatory force in the present study was that the project became an end in itself when in fact it was only one potential solution to the problem of streamlining settlement.^{26, 27} Consequently, the decision-makers concentrated upon delivering Taurus at the expense of questioning whether Taurus was still worth delivering. The risks of escalation may be reduced if decision-makers are forced to confront their options.^{28, 29} The Board reached this juncture in mid-1991. The review missed the point, however, because it asked the wrong question. The Board asked "How

much more time and how much more money?" They should have said, "Why are we doing this?"

Persistence is characterised by 'first order' thinking.³⁰ First order thinking means attempting to solve problems within an existing framework as distinct from re-framing the problem itself. When a solution fails, a 'first order' response is to apply 'more of the same'. For example, a first order solution to achieving cost reductions in manufacturing processes might be to utilise robots, and subsequently faster and faster robots. A second order solution would be to re-engineer in order to eliminate the task altogether thus obviating the need for either humans or robots.

Second order solutions are reached by examining the assumptions which define the problem. For instance, in the early days of computers, a common assumption was that the 'problems' rested in the size of the hardware. Part of the genius of Bill Gates was to recognise that if the software could be made more compact, computers would automatically reduce in size.

In the case of Taurus 'first order' thinking was seen in the emphasis upon maintaining control. It was assumed that because important milestones were being missed, the project must be brought under control. When control failed the response was to apply 'more of the same'. The chief executive altered the management structure in order to give him a greater sense of control. The monitoring group demanded more information. The exercise is futile as it merely generates 'more of the same' that is, another problem to be solved, another dimension to be investigated. The pre-occupation with getting to the end obscures the reality that the end is no longer worth reaching.

Conclusions

The present study began with a concern to understand how and why organizations become involved in risky projects such as Taurus and why they often persist with them when objective conditions dictate withdrawal.

The image which emerges from the present study is of an escalatory spiral whereby one sub-optimal decision forces another until the resultant 'stack up' becomes catastrophic. The present study suggests that the early stages of a venture are crucial as this is the time when fundamental decisions are taken. Such decisions become increasingly difficult to reverse as time goes on.

The dynamics of escalation are seen in a means/ends reversal. The essence of that reversal and the key to understanding escalation is that the project becomes an end in itself. Escalation is then compounded as decision makers devote their energy and skill to making sub-optimal choices work.

Timely and apposite information is generally regarded as a vital pre-condition of effective decision making.¹⁹ The case of Taurus shows that information and knowledge are not synonymous.³ In the present study the information presented to the Taurus monitoring group invariably demonstrated progress and invariably made optimistic projections. It was only when the decision makers stopped using their information to look forwards and instead began to examine it backwards that they realised they had hardly made

any progress at all. The information was there all the time. it was the interpretation that changed.


There are many projects which are large and complicated. The present study highlights the importance of aligning organizational control mechanisms to take account of scale and complexity. The case of Taurus highlights the importance of ensuring that decision makers receive timely and relevant feedback. This point may be especially relevant to projects involving software engineering where, unlike building a bridge, for example, there are few tangible indicators of progress.

More importantly, the present study highlights the limitations of those axioms. It was the pre-occupation with prediction, control and problem solving which sustained escalation. The decision makers' efforts to bring Taurus under control eclipsed the reasons why it was out of control. The lesson for project managers is this: it is not the problem itself which frustrates a solution, so much as the assumptions we make about the nature of the problem.

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Appendix

Research method

The data presented in this paper were gathered as part of a larger project.¹⁹ The project comprised a case study of the London Stock Exchange's decision to commission project Taurus in 1988 and the organization's subsequent decision to cancel the venture five years later, in March 1993.

A basic principle of case study research is the utilisation of multiple data sources in order to provide a measure of corroboration.³¹ Three primary data sources were utilised to reconstruct the Taurus story. The first comprised media accounts. Taurus was well documented by the quality press and in specialist journals covering the financial services industry. The second comprised documentation including letters, memoranda, consultants' reports, project managers work books, and market briefings. The author also had access to the library of the Bank of England's holdings on the subject. The third source consisted of interviews with participants including the executive of the Stock Exchange, members of the technical team, members of the committee which designed Taurus, members of the various Taurus monitoring groups and senior representatives of the securities industry. Only two potential respondents declined to be interviewed.

Over forty semi-structured interviews were conducted between October 1993 and December 1994. The interviews ranged from forty-five minutes to three and a half hours, the most usual being about one-and-a-half hours. Interviewing ceased when accounts became heavily repetitive, a clear sign of saturation. To honour the requests for confidentiality made by certain individuals, no respondent is mentioned by name in the text unless essential. Post titles have been kept deliberately general as another measure of protection.