Riding a tiger: some lessons of Taurus

Helga Drummond
Institute of Public Administration and Management, University of Liverpool, UK

The collapse of project Taurus, the London Stock Exchange's £500 million IT venture, ranks as one of the major fiascos of business history. This paper highlights key mistakes in the project's design and construction and discusses their implications for management.

They … couldn't believe that it wouldn't work. (Member of the Taurus monitoring group)

On Wednesday 11 March 1993 the City of London was shocked by the sudden cancellation of project Taurus, a £500 million IT venture sponsored by the London Stock Exchange[1]. Taurus was intended to achieve for the securities industry what "hole in the wall" cash dispensers had achieved for banking a decade earlier. The project was staffed by a powerful team of experts. It was supported by the entire securities industry and the Bank of England. A series of knowledgeable and influential committees supervised every aspect of the design and construction. Yet it was all for nothing. As the City took stock of lost time money in the days that followed cancellation, Peter Rawlins the Stock Exchange's former Chief Executive warned, "It could happen again." (Waters and Cane, 1993).

The present study focuses on the following questions:
1 Why did the Stock Exchange proceed with a project which was allegedly fundamentally flawed from the start?
2 Why did the Stock Exchange then compound the difficulties by disregarding best practice techniques in constructing Taurus?
3 Why did the Stock Exchange persist with Taurus when it became clear that expectations were futile.

The present study does not attempt to recount the whole of the Taurus saga. (For a detailed explanation see Drummond, 1996a.) The aim is to focus on key mistakes and to discuss their implications for management. It is emphasized that no criticism of any individual, group or organization is implied by this article. The aim is not to pass judgement but to understand what happened so that others may learn.

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 dealt over a glass of sherry (Morgan and Thomas, 1962). In 1987 London's antiquated paper-driven procedures almost collapsed under the sheer weight of trading volumes resulting from the unusually buoyant market (London Business School, 1993). Taurus was intended to provide London with a "state of the art" system of electronic transmission which would enable the securities industry to remove paper from the system, known as de-materialization. De-materialization was seen by the securities industry as an essential pre-requisite to speeding up settlement. For example, it would enable accounting periods to be reduced from three weeks to five days and ultimately facilitate instantaneous settlement. The over-arching aim in reforming settlement was to maintain London's pre-eminence as a world financial centre.

A project on a scale unimaginable

The proverb "he who rides a tiger can never get off" implies that once organizations are drawn into ambitious ventures, they may find it difficult to extricate themselves. This is precisely what happened in the case of Taurus.

Projects fail when support is withdrawn (Saur, 1993). Support was withdrawn from Taurus because the project became so large and so complicated that it could not be built to an acceptable time frame or budget. Yet the original Taurus concept was extremely simple. It could have been constructed within six months using tried and tested technology. Why did it become so complex?

Significantly, no one decided that Taurus should be large and complicated. The problem was that the UK securities industry is very diverse and everyone in the market wanted something different. Since no one was prepared to compromise the only solution open to the Stock Exchange was to combine all the various Taurus models (17 in all) into one immensely complex hybrid.

Complex designs are risky because they are more difficult to execute than simple ones (e.g. Schonberger, 1982). The project director was later to remind the City that Taurus was the largest single computer project in the UK and possibly Europe. That was the problem. One asset manager recalls, "He [the project director] said it was on a scale most of us

couldn't imagine, when we said, 'All we want is a system that allows people to talk to one another.'" (Interview, member of the Taurus monitoring group, July 1994.) Yet it was the City who had made it so complex.

The ambitions of the technical team were another factor which added to the complexity of Taurus. A senior banker recounts:

> Project definition was always the weakest part, and partially ambition drove it to be defined broadly by the project managers. They wanted to solve all the securities problems at once. The minute they had more ambition, the more people tried to influence. So as they responded to those influences … the thing just became more and more complicated. (Interview, member of Taurus monitoring group, June 1994.)

Everyone knew what Taurus was, until they tried to explain it. To some observers the project seemed to have no definable parameters or limits. One investment banker said, "I kept asking, 'What is Taurus?' and was never satisfied with the answers yet nobody stepped forward and said, 'I don't really understand this.'" (Interview, investment banker, July 1994.)

Taurus was not only complicated, it was also urgent. The securities industry insisted on an 18 month timescale which meant that Taurus was due to be implemented by October 1991, an ambitious goal to say the least. A member of one the groups set up to monitor Taurus said:

> I drew some graphs quite early on plotting planned deliverables against actuals. At one point the graphs weren't even converging. They were showing delivery at infinity. Even when they started to converge they were showing delivery in 1995. (Interview, member of Taurus monitoring group, November 1993.)

The technical team did their best to meet the deadline. In order to speed up the process they began constructing Taurus before the design was complete. Another crucial decision taken early on was to build the outwards parts of Taurus first and to construct the central architecture last. The rationale for this approach was to facilitate concurrent working by enabling the market to prepare their own systems for Taurus in good time. Technically, however, this was rather like trying to build a house by digging the foundations last (Waters and Cane, 1993). One employee said, "The technicalities were doable-ultimately. It was a question of how one went about it and the way we had to go about it seemed ridiculous." (Interview, member of the Taurus technical team, May 1994).

Once the securities industry began to see what Taurus might took like they began to demand changes to the design. An investment banker describes the results:

There were multiple meetings at multiple levels with different constituencies who would have to interface with TAURUS and were constantly impacting on its structure and design, "We are the custodian community and we would need this sort of information. We are the registrar community and we would need this sort of information and we would input in this way."

So they (the technical team) were constantly saying, "OK well we will have to re-code and re-do to cope with that."

Then software manufacturers would say, "Ah but then you have to make this change and you have to make that change and you have to interface these things that are now from different suppliers." So the complexity just grew and grew. (Interview, member of Taurus monitoring group June 1994.)

"It was a crucial decision. It was the wrong one."

Another important decision was to buy software package known as Vista to drive Taurus. The decision was taken because it seemed the only way of meeting the timescales. A "rule of thumb" in software engineering suggests, however, that if extensive amendments are required, it is faster to build from scratch (Waters and Cane, 1993). One member of the monitoring group who doubted the proposal said, "All these off the shelf products are fine if you just tinker round the edges. If you have to re-engineer them to anything more than 20 per cent you always have to travel". (Interview, member of Taurus monitoring group, November 1993).

Vista is a good package but it was never designed to drive UK settlement which is unique and complex. As the task of re-engineering commenced, that fact became apparent. A member of the technical team said:

> Like all these things, they have a product which does a certain task. It has some similarities but when you examined it any level of detail, it wasn't really there. Probing it more and more, we realised how way off beam this was going to be…
>
> We said, "What is Vista going to do out of this totality of an outline design we think we might have got?" We had to break it down into chunks, "Well, Vista should be able to do all this" and then we talked to Vista about various things and, "Well, we can't do that. We don't handle it. Anyway it doesn't work very well…" (Interview, member of the Taurus technical team, May 1994.)

Vista had done extensive and highly commended work in the UK. It was therefore assumed that they were familiar with the intricacies of UK practice. Not so, as Vista discovered to their surprise and as the Stock Exchange discovered to their cost. Although the language is similar the meaning can be different. For example, when a rights issue is

made in the UK, share allocations are the basis of "two for one". In other words, for every one unit of stock held, an investor receives two extra new shares. In America, however, "two for one" means that for every one item of stock held, an investor receives only one extra share. Likewise, American dating structures for settlement are different from those in the UK. Time was lost before such errors were discovered. Then more time was lost explaining UK practice to Vista and repeating work. As 1990 wore on deadlines began to slip.

Such difficulties were trivial compared with those that followed. When the Vista package was evaluated substantial parts of the Taurus were marked, "To be announced." Moreover, parts of the system that were clear when the contract was signed had since changed. A Stock Exchange technical manager said:

> You should never … buy a package unless you have firmed up on the requirements and preferably have a pretty damn tight design so that you are able to put a framework around precisely what you want them to do with their product. … At the time we had a set of high level requirements but no real design of how the whole lot would be put together. (Interview, member of the Taurus technical team, November 1994.)

Vista were willing to make adaptations but at what price? The budget for alterations was being rapidly eaten up by so many unforseen developments. One member of the team recalls the looming sense of insecurity:

> Vista would say, "If you want to do it that way? We'll do it that way. Whatever you want, we can do it. Its not a problem!"
>
> And we'd say, "Well how long is this piece of string?"
>
> "We-ll, as long as you want to make it. Whatever you want, we can change it … its not a problem." (Interview, member of the Taurus technical team, May 1994.)

Yet the alterations were a problem. The Vista corporation was not a software house but an enterprise with one ready-made product to install. Accustomed to making minor alterations only, they were ill-equipped to perform the extensive re-engineering now required by the Stock Exchange. Nor did it help that at one stage there were four different groups of staff in the Stock Exchange each giving different instructions to Vista. Vista originally estimated that the project would require 15 to 20 staff. By 1991 the number employed was over 70 as faxes and e-mails were transmitted back and forth between London and New York, decisions made, countermanded and changed again. A member of the technical team said:

> Sometimes we would put an idea to them for evaluation and they would go and evaluate it and then build it. And then we would say, "We are not going to go that route … because there is something not quite right about

this…. And then later on down the track you'd find that some of the old ideas … had resurrected themselves. 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 the Taurus technical team, May 1994.)

The original budget for conversion was £4 million. When the project collapsed expenditure had exceeded £14 million and the task was still far from finished.

"Are we any closer to the end?"

The Taurus monitoring group met every month. Every meeting they asked the technical team the same question, "Are we any further forward?"

Every month they received the same answer, "Yes you are further forward but you are no nearer the end, because the end keeps moving." (Interview, member of Taurus monitoring group, June 1994).

As 1992 wore on with no sign of Taurus appearing, the group grew concerned. One member said:

> You realized that you were increasingly operating at the edge of available technology. We were constantly moving out to a point where not even the major suppliers could guarantee that what they were supplying would work. (Interview, member of Taurus monitoring group, June 1994.)

Then there was the emerging knowledge that portions of completed work were probably useless, as so much had changed in the intervening time. For instance, the coding had been built up over the years, changed and changed again. By November 1992 the group was even hearing rumours that Taurus might never work in the end. Against this backcloth the technical team's habitual optimism was becoming alarming. Another group member said:

> I don't think anybody was withholding information. I think they (the technical team) were just optimistic and couldn't believe that it wouldn't work. They believed that they knew how to make it work but it would just take longer and would cost a bit more. And you would have to put in a phenomenal effort to prove that wasn't true. (Interview, member of the Taurus monitoring group, July 1994.)

In early 1993 the testing schedules were postponed again. This was the last straw for the monitoring group:

> Twelve meetings. A year has gone by and you said at the end of these twelve months, "We haven't really made a hell of a lot of progress." And at the end of 18 months, "We haven't made any progress at all." And that is when we decided to do something. (Interview, member of Taurus monitoring group June 1994.)

Three days later Taurus was cancelled. Some 360 staff including the chief executive lost their jobs. The waste was total in that nothing could be salvaged from the project.

Implications for management

Taurus is one more reminder of the risks inherent in large-scale ventures, especially those involving novel technology (Collingridge, 1992; Griffiths and Willcocks, 1994). A useful heuristic for managers in assessing risk is to apply the so-called "moving-parts" analogy (Drummond, 1996b; Neustadt and May, 1986). Basically, the greater the number of critical dependencies in a plan, the greater the risk of failure. It may seem trite but there is much to be said for keeping things simple and utilising tried and tested solutions.

If a project is unavoidably large and complicated then the organization's control mechanisms must assume "large and complicated". Although control is a non-value adding activity, too little can be dangerously counter-productive.

In the present study the management of the inter-face between the Stock Exchange and the Vista company was inadequate. Such weaknesses might have been identified sooner had the Stock Exchange not removed Touche Ross, the external monitors as part of a cost-cutting exercise.

No control mechanism is master of time, however. Another disadvantage of solutions involving "long-haul" projects like Taurus is that they are highly susceptible to environmental changes (Northcraft and Wolfe, 1984). Such changes may undermine projects by destroying key assumptions. Another reason for cancelling Taurus was that by 1993 the commercial imperative for the venture had declined. For example, the cost-benefits equation compiled between 1989 and early 1990 envisaged that trading volumes would continue to expand. It was assumed that such expansion would counterbalance much of the cost of implementing Taurus. In fact, the market contracted. Taurus, moreover, was conceived during the economic boom of the late 1980s. By 1993 prosperity have given way to recession thus curtailing funds for investment. A monolith like Taurus seemed inappropriate to the new economic climate.

Maintaining a grip on reality

Most organizational ventures involve negotiation. It is probably fair to say that most projects reflect some compromise between what is technically efficient and what is politically acceptable (Bower, 1983). The present study highlights the transformative potential of negotiation and compromise. The simple Taurus concept was gradually emasculated and the venture effectively became "something else". The transformation meant that Taurus was no longer capable of meeting the original requirements of providing a cheap and speedy solution for streamlining settlement.

It is unclear why decision makers lose sight of their objectives in this way. One explanation is that where projects evolve gradually as in the present study, people forget the absolute magnitude of change (Kahneman and Tversky, 1982; Tversky and Kahneman, 1981). When that happens they may not see the venture for what it has actually become.

Another possibility concerns our ways of thinking about decisions and decision making. In theory, decision making involves a clear and definite choice between alternatives.

Yet the notion of decision is basically a metaphor, a device which enables us to understand "something else" (Brown, 1977; Morgan, 1980). The decision metaphor focuses attention on volitional acts. It obscures how events can be shaped in other ways. As the present case shows, outcomes are not always the product of clear and conscious decisions by duly authorised personnel. The people with the most influence over Taurus were those with least responsibility for the results.

It is easy to suggest that the Stock Exchange should have insisted on freezing the requirements before commencing construction. Part of the problem, which was only evident in retrospect, was that many of the requests for change were in themselves trivial. It was their cumulative impact that was destructive. What occurred was a form of "stack-up" whereby a change in one part of the system, created an unpredictable effect elsewhere in the system and so on (Perrow, 1984). This only became clear when the Chief Executive of the Stock Exchange examined Taurus in late 1992. Rawlins said, "It came screaming home to me that nobody had really thought about it. Nobody had planned the thing. Nobody had analyzed it." (Interview, Peter Rawlins, October 1993.)

Likewise it is easy to suggest that the risks should have been evident from the start. It is important to remember that information too is basically a metaphor. However comprehensive and meticulous our data may be, and Taurus was extensively documented, it is an abstraction and by definition "false". We can never grasp the whole (Brown, 1977). In the present study the decision makers thought they knew what Taurus was. Their knowledge was an illusion. It is one thing for decision makers to grasp their information, it is another thing for them to understand the limits of their data (Toffler, 1992).

Should the Stock Exchange have made more allowance for possible environmental changes in their plans?

In theory, information informs decision making. There is a school of thought, however, which argues that its role is largely symbolic. Charts, graphs and analyses make the process appear objective and rational when the reality is that business plans are inevitably based on guess work (Meyer and Rowan, 1978).

Ultimately, what choice do decision maker's have but to "play their cards and take their chances?" (Bowen, 1987).

The point is, it is easy for decision makers to forget they are doing just that. Managers cannot afford to allow the sophistry of their information to lull them into a false sense of security. It is safest to think of projections and forecasts as wishful thinking. We may not care to emphasise it, but that is essentially what they are.

The paradox of consequences
By mid 1991 Taurus was running 100 per cent behind schedule and had consumed its entire budget. Furthermore, it was clear that the legal and security implications of de-materialization had been seriously underestimated. Why did the Stock Exchange persist despite such clear evidence that the original objectives could not be met?

Taurus exemplifies the so called "paradox of consequences" that is, the unintended and sometimes bizarre consequences of rationality itself (Drummond, forthcoming; Watson, 1994). In the present study it was rationale to find ways of shortening the development cycle. Yet the seeds of destruction were contained in those very solutions (Watzlawick, 1988).

Taurus highlights how unwarranted persistence can occur because projects become ends in themselves (Drummond, forthcoming; Watson, 1994). A member of the Taurus monitoring group describes this phenomenon:

> It is easy to look back and say, "Why didn't you see it all the time?"
>
> Well, most disasters look obvious in hindsight. When you are in the middle of it and your objective is to get to the end you take each issue and you try to deal with it, and then another issue and you try to deal with it and another issue and you try to deal with it. It is only the cumulative of the issues that you finally say, "When is this going to end?" (Interview, member of Taurus monitoring group, June 1994.)

In the present study the decision maker's over-riding objective was to get to the end. "Lets get the bloody thing done and behind us," they said to one another. (Interview, chief executive, October 1993.)

Consequently the decision makers concentrated on solving the problems at the expense of questioning the existence of so many problems (Watzlawick *et al.*, 1974), diligently bashing one peg down only to see another fly up, no closer to the end.

Everyone was so intent on delivering Taurus that the question of whether Taurus was still worth delivering was largely eclipsed. By itself Taurus achieved nothing. It merely paved the way for streamlining settlement by enabling the securities industry to remove paper from the system. There were other ways of speeding up settlement. Indeed after Taurus was cancelled settlement periods were reduced from three weeks to five days within the confines of a paper-driven system.

The case of Taurus illuminates a fundamental dilemma of management. Managers and professionals are expected to exhibit commitment and enthusiasm and to "get things done despite obstacles". Yet in the present study it was precisely those factors which helped to complicate and perpetuate Taurus. The present study offers no answers other than to suggest that managerial prescriptions are like drugs. They possess unwanted but unavoidable side-effects. The art of management is being able to judge when the cure is worse than the disease (Watzlawick, 1988), and, to recognize that too much commitment can be as bad as too little (Randall, 1987).

When is enough enough?
We will never know whether Taurus would have worked in the end. What is clear is that it would have required at least another two years to complete and probably longer.

Abandoning a large-scale project like Taurus is no light under-taking. While there are no universally applicable rules of when to abandon failing projects, the time to consider that possibility is when it becomes clear that the original expectations cannot be met (Bowen, 1987). Indeed Taurus was reviewed in mid-1991. The review, however, focused on how much more money and how much more time were required to complete the project. A more appropriate question might have been, "What exactly are we doing, and why?"

Capitalising on success
So far the discussion has focused on decision failures. A re-appraisal is equally appropriate if it appears that original expectations could be exceeded. Evidence suggests that individuals tend to compartmentalise their resource allocations setting so called "mental budgets" for investment decisions. Mental budgeting is significant because people tend to cease pursuing a particular line of activity once the budget for that activity has been expended. In other words, whereas escalation theory suggests that unwarranted persistence is the

usual response to failure, mental budgeting raises the possibility of un-warranted withdrawal (Heath, 1995).

Although the theory pertains to the individual level of analysis, the concept seems relevant to organizations as they regularly define budgets and engage in other forms of limit setting. Such controls are counter-productive if they result in good ideas being dropped. A review may prompt an organization to allocate additional resources to the venture, or to re-orientate its strategy in a timely fashion in order to capitalise on unforseen possibilities. Fiascoes such as Taurus capture attention because they are dramatic and often public. A more pernicious and scarcely researched source of loss may lie in potentially promising ventures which are curtailed. Taurus wasted millions of pounds. What of the elusive quadrillions which dissolve into ether?

Note
1 The Stock Exchange spent over £80 million on the construction of Taurus. Organizations in the City of London spent an estimated £400 million in preparation for Taurus.

References
Bowen, M.G. (1987), "The escalation phenomenon reconsidered: decision dilemmas or decision errors?", *Academy of Management Review*, Vol. 12, pp. 52-66.

Bower, J.L. (1983), *The Two Faces of Management: An American Approach to Leadership*, Houghton Mifflin, Boston, MA.

Brown, R.H. (1977), *A Poetic for Sociology*, Cambridge University, Cambridge.

Collingridge, D. (1992), *The Management of Scale*, Routledge, London.

Drummond, H. (1996a), *Escalation in Decision Making: The Tragedy of Taurus*, Oxford University Press, Oxford.

Drummond, H. (1996b), *Effective Decision Making*, Kogan Page, London.

Drummond, H. (forthcoming), "Is escalation always irrational?", *Organization Studies*.

Griffiths, C. and Willcocks, L. (1994), *Are Major Information Technology Projects Worth the Risk?*, Oxford Institute of Management.

Heath, C. (1995), "Escalation and de-escalation of commitment in response to sunk costs: The role of budgeting in mental accounting", *Organizational Behavior and Human Decision Processes*, Vol. 62, pp. 38-54.

Kahneman, D. and Tversky, A. (1982), "The psychology of preferences", *Scientific American*, Vol. 246, pp. 162-70.

London Business School (1993), *Equity Settlement in London: Its Importance to London as a Financial Centre*, The City Research Project, London.

Meyer, J.W. and Rowan, B. (1978), "Institutionalized organizations: formal structure as myth and ceremony", *American Journal of Sociology*, Vol. 83, pp. 340-63.

Morgan, E.V. and Thomas, W.A. (1962), *The Stock Exchange*, Elek, London.

Morgan, G. (1980), "Paradigms, metaphors and puzzle solving in organization theory", *Administrative Science Quarterly*, Vol. 25, pp. 605-22.

Neustadt, R.E. and May, E.R. (1986), *Thinking in Time: The Uses of History for Decision Makers*, Free Press, London.

Northcraft, G.B. and Wolfe, M.A. (1984), "Dollars sense and sunk costs. A life cycle model of resource allocation decisions", *Academy of Management Review*, Vol. 9, pp. 225-34.

Perrow, C. (1984), *Normal Accidents*, Basic Books, New York, NY.

Randall, D.M. (1987), "Commitment and the organization: the organization man re-visited", *Academy of Management Review*, Vol. 12, pp. 460-71.

Saur, C. (1993), *Why Information Systems Fail*, Alfred Waller, Henley.

Schonberger, R.J. (1982), *Japanese Manufacturing Techniques: Nine Hidden Lessons in Simplicity*, Free Press, New York, NY.

Toffler, A. (1992), *Powershift*, Bantam, London.

Tversky, A. and Kahneman, D. (1981), "The framing of decisions and the psychology of choice", *Science*, Vol. 211, pp. 453-63.

Waters, R. and Cane, A. (1993), "Sudden death of a runaway bull", *Financial Times*, 19 March, p. 11.

Watson, T. (1994), *In Search of Management: Culture Chaos and Control in Managerial Work*, Routledge, London.

Watzlawick, P. (1988), *Ultra-solutions: How to Fail Most Successfully*, Norton, New York, NY.

Watzlawick, P., Weakland, J.H. and Frish, R. (1974), *Change: Principles of Problem Formation and Resolution*, Norton, New York, NY.

| Application questions

1 What can be learned for your organization from this case study? From any case study?
2 Is it true to say, based on the evidence presented by the author, that Taurus was "flawed from the start"?
3 What has been the worst decision made by your organization? What did you learn from it?