C A S E

GUJARAT AUTO

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Pradip Mistry, Finance Director of Gujarat Auto, walked through the Arrivals Hall at Ahmedabad airport in India and turned his mobile phone back on after his flight from Bangalore. Among the 10 messages was one from his assistant to say that the TPK proposal was ready for him to review. He had set aside the whole day to do this, for he had to make a recommendation to Dilip Patel, the company's Executive Vice-President, about what course to take. The proposal had been put together by Saini Nehwal, a very promising young project manager, for whom this assignment was a very important chance to impress the executive team at Gujarat Auto.

The TPK project was just the kind of opportunity that fitted Gujarat Auto's strategic ambitions, but it also carried a lot of risk. Before making his recommendation to Dilip Patel, Pradip Mistry wanted to understand every aspect of the proposal.

History of Gujarat Auto

Gujarat Auto started out as a joint venture between an Indian engineering company and a German diesel engine manufacturer in the 1960s. After the joint venture agreement came to an end, the Indian parent set up Gujarat Auto as an autonomous subsidiary. The company's fortunes blossomed as India's economy began to grow dramatically, thanks to burgeoning demand for tractors, trucks and stationary electricity generators.

Gujarat Auto's major customers had always been Indian manufacturers, many of whom had sourced engines on a product line by product line basis, with relatively short production runs. Under pressure to reduce costs and improve product quality, those firms had been examining the concept of single sourcing components—going for more standardised designs and entering contracts for larger quantities from a single supplier. Another advantage of this approach would be that they would have a close relationship with one company and so be able to set purchase schedules at shorter notice and keep down stocks of built engines.

The TPK opportunity

One of the largest Indian tractor makers, TPK, had decided that rather than make its own engines (which it has done for 40 years) it would buy them in. In part, that

decision was because the TPK design was out of date and the costs of developing a new engine would be much more than TPK was prepared to spend. Instead it had issued just such a request—not only to domestic Indian suppliers, but also to several of the major global diesel engine manufacturers—for the exclusive supply of all its engines for five years, potentially encouraging foreign firms to set up new operations or joint ventures in India.

This opportunity had presented Gujarat Auto with a dilemma. If they did not bid for this contract, they would be opening the door to competitors to take 100% of the engines bought by one of India's biggest customers—as well as forgoing the sizable and profitable aftermarket business. On the other hand, while a successful bid would involve the kind of high capital investment that would deter rivals and new entrants, the risks involved in bidding were very high.

None of Gujarat Auto's current factories was big enough to handle the envisaged volume required by TPK. Furthermore, TPK had made it clear that a single source supplier would have to be able to meet peak demand from TPK's own factories, without holding stock or lengthening order lead times.

As he sipped his tea, Pradip Mistry reflected on the questions Dilip Patel had asked him at their last discussion about the proposal.

- Gujarat Auto already achieved a high return on investment (ROI) from its current operations. Would the new investment dilute that?
- Would the investment in new plant and equipment be offset by a reduction in labour and other costs?
- How certain is the mid- to long-term revenue from TPK? This proposal required an investment in new facilities before knowing whether at least one long-term contract would be in place to recoup the investment.
- Did this proposal maximise ROI, Gujarat Auto's sales potential, or total profit?

Pradip Mistry looked again at the expected profit after tax and average rate of return—based on sales of 70,000 engines per year.

The Gujarat Auto business strategy

Gujarat Auto also had a series of strategic principles which had been applied consistently to investment decisions. Pradip Mistry made a note (in priority order) of the ones he felt were most relevant to this proposal.

1. Bid only to sell products that will maintain high sales margins over the long term.
2. Develop only products in which the product technology or the production process offers a significant edge against the competition, to enable Gujarat Auto to maintain a technical lead.
3. Employ the most advanced technology in new projects that is either known by us, or is the next logical step in our technological advancement.
4. Encourage projects which allow project managers to develop their skills as "intrapreneurs" (entrepreneurs inside the business) and project champions.
5. Operate small factories with fewer than 500 employees to ensure high efficiency and good working relations.

Demand Forecasts

Three scenarios were included in the proposal to test the robustness of the investment case:

Scenario 1 assumed that the new engine would be successful, with TPK increasing its output in line with economic growth in India, and maintaining exclusive supply beyond the first five years.

Scenario 2 assumed that after five years, TPK decided to dual source, and began to take engines from another company.

Scenario 3 assumed that the TPK product line did not do well, perhaps because TPK suffered from new competition in the tractor market, or worse, the engine was a technical and market failure. The three scenarios are set out in Table 1.

Manufacturing strategy

In truth, however, there could be little real confidence in these forecasts. The Indian tractor market was becoming highly dynamic. New competitors from places like China were already making inroads, and farmers were seeing fluctuating prices for their produce which affected their confidence about investing in expensive equipment like a tractor. The proposal noted that "every effort should be made to minimise our exposure on this investment and maximise our flexibility."

Gujarat Auto had been monitoring developments in the market for some time and it was not a surprise when TPK announced their plan to single source. In anticipation of this, Pradip Mistry had authorised a study to be carried out on how Gujarat Auto could scale up to produce tens of thousands of engines from a single factory.

Table 1 Demand Forecasts

Year	*Scenario 1*	*Scenario 2*	*Scenario 3*
Year 1	69,000	69,000	69,000
Year 2	73,000	72,000	72,000
Year 3	90,000	81,000	77,000
Year 4	113,000	95,000	68,000
Year 5	125,000	87,000	62,000
Year 6	145,000	74,000	47,000

The main parts of the factory would be a machine shop (where the crankcase, cylinder head, crankshaft and piston rods would be machined in different areas) and an assembly shop (where these parts, and components bought in from other suppliers, would be put together to create the finished engine).

Three manufacturing methods were considered for the machine shop: batch machining of parts using computer numerically controlled (CNC) equipment, a flexible manufacturing system (FMS), and high volume, low-unit-cost transfer machines. The transfer machines would be ideal for very high volumes of standardised parts, but changeovers would be slow and expensive.

The conclusion was that the FMS was the best route, as it would allow Gujarat Auto to produce different versions of the TPK engine at a realistic cost, and also supply engines to other customers if required. Not only would the FMS be able to produce different versions of the engine, it would also be able to machine different materials, such as aluminium and cast iron.

The option of using robots for a significant part of the engine assembly was examined in detail. This had attractions, but it was felt that without a firm commitment from TPK, the high initial investment could not be justified. Instead the factory would be designed to allow robotic assembly to be introduced later.

In line with the flexibility of the plant, the new factory would have innovative working practices.

- Machine operators would be trained to do most of the maintenance of their own machines.
- All operators and assembly workers would be responsible for inspecting their own work.
- There would be only four skill groups on the factory and everyone would be trained to do whatever work was required within that skill group. Thus a worker in skill group 3 might be asked to spend a month working in assembly at that skill level and then a month in the machine shop at skill group 3.
- There would be no time clocks in the factory.

Two specialist firms made proposals for the entire design, construction and fitting out of the new factory. Gujarat Auto was also in discussion with four vendors of machining and assembly equipment. This involvement was crucial, since design for manufacture would be a key factor in ensuring that the new engines were reliable and performed well.

An organisation structure was defined, and a schedule for ramping up employment to the full level. The forecasts of factory output assumed a learning rate of 80% over the first 1,000 engines from the new factory.

Financial considerations

The financial consequences of investing in the new factory were considered from various angles. The consequences of doing nothing were examined, recognising that Gujarat Auto had a successful track record in producing engines for a wide range of customers in moderate volumes. Also examined were the likely effects

Table 2 New factory site capital costs in Indian rupees (₹)

Land and site preparation	
Land	₹14,760,000
Access roads and car park	₹7,440,000
Landscaping	₹1,320,000
Building costs	
Building	₹93,600,000
Ventilation and air conditioning	₹13,560,000
Power supply	₹12,300,000
Employee services	₹10,620,000
Legal fees and permits	₹1,560,000
Auxiliary equipment	
Company signage	₹1,500,000
Containers, racks, etc.	₹1,980,000
Factory data centre	₹8,880,000
Coolant disposal	₹5,820,000
Furnishings	₹3,060,000
Forklift trucks	₹4,320,000
Total	₹180,720,000

on other parts of the business. Gujarat Auto operated three factories in western India. The new plant would probably be located closer to the TPK main factory in the state of Uttar Pradesh, in north eastern India. One possibility was closing one of the existing factories and transferring its work to the new one, since this would be closer to more of Gujarat Auto's customers.

For the TPK proposal the investment in the new factory could be summarised as:

The cost of the production equipment for the new factory would be ₹115,660,000 and it would need ₹20,000,000 of working capital at start up. All equipment would be depreciated over eight years; the building would be depreciated over 25 years. The business case assumed that the manufacturing cost of each engine (including overheads and transport to TPK) would be ₹16,220, and the selling price to TPK would be ₹19,400.

Pradip Mistry had been discussing the whole proposal with his colleagues. One manager asked what difference it would make if TPK took only 70% of the forecast volume in Year 3, or alternatively, if they took 50% more than the forecast. At what point would additional plant and machinery be considered?

Another manager doubted that a substantial share of the volume would be lost to the competition after the end of the five-year exclusive contract. That would only occur if Gujarat Auto fell behind technically or produced poor quality products—neither of which seemed likely. He also questioned the high margins assumed in the proposal. Surely the bidding process would mean that whoever got the TPK contract would have to manage quite low margins as a reward for getting an exclusive deal.

Pradip Mistry had his own concerns about the project. He wondered about the volatility in the market for agricultural equipment. He worried about how aggressively foreign competitors would bid in order to gain a foothold in the Indian market. He worried whether Gujarat Auto could afford not to get this business.

QUESTIONS

1. How did Gujarat Auto handle the risk that their assumptions about the sales of engines to TPK might be too optimistic?
2. Were Gujarat Auto's costs for the new factory in Table 2 derived from a top-down or bottom-up process?
3. What were the answers to Dilip Patel's questions?
4. What other factors are relevant to this issue?
5. How do the changes in assumptions mentioned by the other managers affect the proposal?
6. What recommendation should Pradip Mistry make to Dilip Patel? Why?

This article clearly describes the importance and impact of cost-related issues on a project. These issues can significantly alter the profitability and even success of a project. Costs are discussed from three viewpoints: that of the project manager, the accountant, and the controller. Not only are the amounts of expenditures and encumbrances important, but their timing is critical also. Perhaps most important is having a project cost system that accurately reports costs and variances in a way that can be useful for managerial decisions.