

Air Land Transport, Inc.: Using NPV calculations for capital budgeting decisions

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ABSTRACT

Air Land Transport, Inc. (ALTI), a freight forwarding company with more than 50 locations throughout the United States, is considering a significant change to their business model in order to sustain high earnings growth. ALTI's CEO has asked for a net present value (NPV) and internal rate of return (IRR) analysis to determine whether to keep the existing model where ALTI consigns their shipments to third party freight lines or purchase and operate their own trucks for the major shipping routes. The purpose of this fictitious case study is to demonstrate the use of discounted cash flow (DCF) analysis to make capital allocation decisions. The target audience for this case is junior and senior level managerial accounting students. This case assists accounting educators by providing real world context to a commonly taught academic subject.

Keywords: NPV analysis, IRR analysis, Discounted Cash Flows, Capital Budgeting



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INTRODUCTION

This case is designed to assist accounting educators in teaching net present value (NPV) analysis to upper-level undergraduate accounting students. This case goes beyond traditional textbook materials by adding the context of real-world business decisions where qualitative managerial factors must be weighed against financial analysis to create optimal managerial decisions. Students are asked to properly identify cash flows, calculate NPV and IRR for two separate projects, identify non-financial factors that may influence managerial decisions, and then make recommendations based on both their quantitative analysis and qualitative factors. Studying NPV in a context-rich case setting allows them to better grasp how this important capital budgeting tool assists managers in making critical business decisions.

BACKGROUND

Tad Phillips, CFO of Air Land Transport, Inc. (ALTI), stared out the floor to ceiling windows of his corner office. The view of the Front Range from the ALTI headquarters building in Denver was fantastic each evening as the sun set behind the mountains. Tad always took a few minutes each day to admire the view and consider the events of the day. A knock at the door interrupted Tad's daily wind-down. Before Tad could even say enter, Preston Smith walked in. Preston was the CEO and founder of ALTI, and over the course of more than 30 years Preston had grown ALTI from a single-location company with 2 employees to one of the largest freight forwarding companies in the United States. Preston practically shouted, "Congratulations, Tad! You've lasted three whole years!" Tad, slightly stunned and thoroughly confused, glanced at the calendar and realized that it was exactly three years ago that Preston had promoted him to CFO. "You're a lot like me, Tad. You started at the bottom in this company and have worked your way to the top. I remember when you were working on a loading dock in our Memphis office. Look at you now!" Preston exclaimed. He continued, "Grab your coat. Let's go have a good dinner and forget about work for a while." Tad had worked closely with Preston for nearly a decade, and taking an employee to dinner, even his CFO, was unusual behavior. Forgetting about work was very unusual behavior. He also knew that Preston didn't like to ask twice for anything, so he grabbed his coat and headed out the door wondering whether this really was about celebrating a work anniversary.

Two hours and one great dinner later, Tad started to think that maybe Preston had just wanted to celebrate with a member of his executive team. They had talked about skiing, baseball, traffic, kids – everything except work. It was a good opportunity to get to know Preston better as a person, rather than just his boss. "I really appreciate this dinner, Preston. It's been very generous of you," Tad said. Preston smiled a wry smile, "It has been nice, but it's not just pure generosity that motivated me to make you come to dinner tonight. I know I said we would forget about work, but let me ask you something, Tad – do you think you've done a good job as CFO?" The tone of the conversation shifted with that single question, and Tad was suddenly grateful he had opted for water with dinner rather than wine. Tad didn't miss a beat with his response, "ALTI has never been more profitable. Our earnings have grown by about 10 percent each of the last three years, and we're on pace to be close to that again this year. I promised you that I would make us a more efficient company, and I've done that."

Preston nodded in agreement, "You're absolutely right. We are more efficient. We are more profitable. If it weren't for your efficiency initiatives, I think our earnings would have

flatlined. The first year you were CFO, earnings rose 13 percent. The second year was 11 percent, last year it was nine percent, and this year will be down again. I see a trend there, and that trend tells me that we are closing in on peak efficiency. Getting marginally more efficient each year can only take us so far. At some point there will be no more operational efficiencies to squeeze out and no more costs to trim. What then?" Tad took a moment to think about his response. He knew this question was the exact reason why Preston had asked him to dinner, and he needed to give a good answer.

Tad began, "There are still some more cost control and efficiency gains we can make, but I agree with you that we can't continue to get leaner forever. At least we can't in a meaningful way. I'd love to just tell you that we'll find growth on the revenue side, but we both know that we have already operating in every major city in North America, we have opened offices in China and Europe, we have started shipments by sea to go along with air and land shipments, and we have aggressively pursued new clients in every single market. Here's the stark truth, Preston – we've cut costs as much as we reasonably can and finding new revenues is a real challenge. We are headed for a future where ALTI is a stable, mature business with steady profits. Big growth would require some major changes to ALTI."

Preston's eyes lit up, "Exactly, Tad. My dad used to tell me when there's no more low-hanging fruit, get a ladder. And when there's no more fruit on the tree, get a new tree. It would take something major, something bold for us to stay in growth mode. There's nothing wrong with being stable, mature and steady, but all I've ever done is grow this business. I'm not ready to quit doing that yet. ALTI may become an old cash cow business one day, but that's not going to happen while I'm still running things. We need to get a new tree, Tad. Our basic model is that we get shipments from all our different clients in each city, we bundle together shipments headed to the same destination cities, we use a freight company like Quick, Boomerang, or Sky Freight to get those bundled shipments to the destination, then we pick them up and do the deliveries to all the final recipients. So, Tad, which part of that do we not do?"

"We don't actually move the freight from city to city. We use contracted truck, air, and sea freight lines for that part. That is the freight forwarding model," Tad replied. Preston stared at Tad for a long moment, "Yes, that is the freight forwarding model. And we've just about mastered that model. But the real question is why does that have to be the freight forwarding model?" Tad measured his response seeing that Preston had already given this a lot of thought, "Because we don't generate enough freight to fill a whole network of trucks going to from city to city. It's cheaper to use existing freight companies than to move the freight from city to city on our own."

Preston gave another subtle smile, "Do you know that, Tad? Or are you assuming that? Because I suspect we could own and operate our own trucking equipment for some freight routes and do it significantly cheaper than using our existing freight line partners. And your job is to do the analysis to find out if my suspicion is true."

"I have little doubt that there are certain freight routes we could do cheaper than any of our freight line vendors. But, Preston, if we start using our own equipment and stop using our current freight partners for some of their most profitable freight routes, what's to stop them from raising the prices they charge us for all of the routes we can't service ourselves?" Tad asked. "Let me worry about that, Tad," Preston said as he poured the last of a bottle of wine into his glass, "Just pick a few of our heaviest freight routes and figure out if investing the money in our own trucks and trailers makes good financial sense. Then we'll have better information to decide whether it makes good business sense. Listen, I know this is a radical idea. I haven't made any

decisions about it beyond asking you to do the financial analysis. The numbers may say it's the worst idea in the history of bad ideas. They may also say that it's how we keep ALTI growing. You're the only one I've talked to about this, and I want you to keep this confidential. Gather all the data and do all the analysis yourself, then we can meet again. Heck, I'll pay for another dinner. That way the worst that happens is we get two great meals out of this! It's getting late, Tad, and you've got a lot of work to do starting tomorrow."

Project Analysis

Tad knew that a project such as what Preston envisioned would require a significant amount of capital outlays. He also knew from his accounting and finance background that the best way to determine the financial viability of a capital project would be to compute its net present value (NPV) and internal rate of return (IRR). Both of these discounted cash flow (DCF) models require a detailed understanding of all the cash outflows and inflows that the project will generate along with an accurate estimation of when those cash flows will occur during the project life. Lastly, DCF models need a discount rate that is appropriate for the project.

Before he could begin gathering the data he needed, Tad first had to select which freight routes to analyze. He knew that he needed to choose routes between cities that generated heavy amounts of nightly freight bound for each other since a truck leaving destination A headed to destination B would have to turn around and travel from destination B to destination A. Having as much freight as possible each way would make the project more viable. Tad had fortunately designed and implemented a daily reporting system that tracked the amount of outbound freight from each of ALTI's offices. After reviewing the data for the prior six months, Tad determined two routes to initially analyze – Chicago / Nashville (ORD-BNA) and Chicago / Minneapolis (ORD-MSP).

Routes to and from ALTI's Chicago office fit the characteristics Tad was looking for since ALTI had numerous major clients in the Chicago area that generated significant and steady freight each night. Tad also realized that these routes had an extra bonus in that they were just in the overnight range for a truck, but ALTI's current contract truck line in Chicago, Boomerang Trucking, only offered two-day service to Nashville and Minneapolis. This meant ALTI was flying all overnight shipments using Sky Freight to these destinations at a substantial cost that could be saved with ALTI's own trucking equipment. Exhibit 1 displays the average freight per night and average freight cost per night for the routes being analyzed.

Tad had more than a decade of experience in the freight industry, so compiling a list of costs associated with operating a trucking route was a fairly simple exercise for him. He quickly listed the cost of the four trucks and four trailers that would be required to fully service the two routes, insurance, registration and fees, fuel, tolls and taxes, maintenance, and driver costs. He also knew that this project would require an injection of working capital that would be required as long as the project lasted and that the trucks and trailers would have a residual value at the end of their useful lives. Tad decided to analyze the project using a five-year horizon since that matched the useful life of the trucks and trailers. He also decided to use a discount rate of 12% since that matched ALTI's typical required rate of return on new projects. Exhibit 2 displays Tad's estimates of project cash flows along with the expected timing and frequency of those cash flows. With all this data collected, Tad was ready to analyze the viability of the project and report back to Preston.

STUDENT ASSIGNMENT

1. Determine ALTI's monthly shipping cost savings for the ORD-BNA and ORD-MSP freight routes.
2. Compute the NPV and IRR of the ORD-BNA and ORD-MSP projects.
3. Besides financial considerations such as NPV and IRR, what other factors should Tad and Preston consider when deciding whether to pursue this project?
4. Write a brief memo to Preston Smith recommending which projects, if any, to pursue. Include an explanation of what factors lead to your recommendation.

Exhibit 1			
Average Daily Freight (lbs.) ORD-BNA			
Boomerang Trucking (.39 per lb.)			
Shipping Day	Arrival Day	From ORD to BNA	FROM BNA to ORD
MON	WED	2,252	1,642
TUE	THU	2,171	1,798
WED	FRI	2,533	1,853
THU	MON	2,159	1,525
FRI	MON	2,375	1,570
Weekly Average Total		11,490	8,388
Average Daily Freight (lbs.) ORD-BNA			
Sky Freight (1.01 per lb.)			
Shipping Day	Arrival Day	From ORD to BNA	FROM BNA to ORD
MON	TUE	314	222
TUE	WED	347	212
WED	THU	323	225
THU	FRI	422	229
Weekly Average Total		1,406	888
Average Daily Freight (lbs.) ORD-MSP			
Boomerang Trucking (.36 per lb.)			
Shipping Day	Arrival Day	From ORD to MSP	From MSP to BNA
MON	TUE	2,102	1,839
TUE	WED	2,022	1,784
WED	THU	2,462	1,874
THU	MON	2,286	1,831
FRI	MON	2,152	1,802
Weekly	Average	11,024	9,130
Average Daily Freight (lbs.) ORD-MSP			
Sky Freight (.98 per lb.)			
Shipping Day	Arrival Day	From ORD to MSP	From MSP to ORD
MON	TUE	286	205
TUE	WED	313	199
WED	THU	299	219
THU	FRI	371	225
Weekly	Average	1,269	848

Exhibit 2			
ORD-BNA			
Item	Cash Outflow	Cash Inflow	Frequency
Truck (2)	100,000 + 4000 per month		Beginning and Monthly
Trailer (2)	30,000		Beginning
Working Capital	25,538		Beginning
Maintenance	6000		Beginning and Annual
Fuel	5625		Monthly
Driver	8000		Monthly
Taxes and Tolls	400		Monthly
Registration	500		Beginning and Annual
Cost Savings		?????	Monthly
Truck Residual		25000	End
Trailer Residual		3000	End
Return of Work Cap		25538	End
ORD-MSP			
Item	Cash Outflow	Cash Inflow	Frequency
Truck (2)	100,000 + 4000 per month		Beginning and Monthly
Trailer (2)	30,000		Beginning
Working Capital	24,227		Beginning
Maintenance	4800		Annual
Fuel	4751		Monthly
Driver	8000		Monthly
Taxes and Tolls	400		Monthly
Registration	500		Annual
Cost Savings		?????	Monthly
Truck Residual		30,000	End
Trailer Residual		3,500	End
Return of Work Cap		24,227	End

TEACHING NOTE

TN 1 – Students should quickly realize that cost savings for each freight route are a blend of shipments currently being consigned to Boomerang and to Sky Freight. Instructors can assign the case as a weekly, monthly, or annual analysis depending on the desired complexity. Weekly and monthly cost savings are displayed in Table 1.

Table 1						
Cost Savings ORD-BNA						
	From ORD (lbs.)	From BNA (lbs.)	Avg Weekly lbs.	Cost per lb.	Weekly Total Cost	Monthly Total Cost
Boomerang	11,490	8,388	19,878	.39	7,752	34,885
Sky Freight	1,406	888	2,294	1.01	2,317	10,427
				TOTAL	10,069	45,312
Cost Savings ORD-MSP						
	From ORD (lbs.)	From MSP (lbs.)	Avg Weekly lbs.	Cost per lb.	Weekly Total Cost	Monthly Total Cost
Boomerang	11,024	9,130	20,154	.36	7,255	32,648
Sky Freight	1,269	848	2,117	.98	2,075	9,337
				TOTAL	9,330	41,985

TN2 – Instructors who choose to have students calculate NPV and IRR on a weekly (260 weeks) or monthly (60 months) basis will likely allow students to use technology such as Excel to better handle the volume of information and calculation required under those two options. Instructors who choose to have students complete the analysis on an annual basis may opt for hand calculation. Regardless of the time-period choice, properly sketching out cash inflows and outflows is the first critical step. Table 2 displays the cash inflows and outflows on a monthly basis as well as the NPV and IRR also computed on a monthly basis.

High NPV and IRR will undoubtedly lead students to conclude that both projects are not only viable but should likely be pursued. This will give the instructor an opportunity to discuss broader management issues to assist students in understanding that financial is only one important aspect of managerial decision making.

NPV and IRR Analysis @ 12% Annual Discount Rate			
Month	NCF ORD- BNA	NCF ORD- MSP	Description
1,13,25,37,49	20,787	19,534	Monthly cost savings, monthly truck payments, annual maintenance, fuel, driver costs, taxes and tolls, and annual registration
2,14,26,38,50	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
3,15,27,39,51	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
4,16,28,40,52	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
5,17,29,41,53	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
6,18,30,42,54	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
7,19,31,43,55	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
8,20,32,44,56	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
9,21,33,45,57	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
10,22,34,46,58	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
11,23,35,47,59	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
12,24,36,48	27,287	24,834	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls
60	80,825	82,561	Monthly cost savings, monthly truck payments, fuel, driver costs, taxes and tolls, truck residual values, trailer residual values, return of working capital
NPV – Monthly Basis	1,074,915	973,003	
IRR (Annualized)	202%	186%	

TN 3 – The high NPV and IRR will lead students to conclude, from a financial perspective, that the new projects should be quickly adopted. This will give the instructor an opportunity to point out that such high potential returns must have been available to ALTI and others in the same industry for some time. This implies that factors must exist that have

restrained freight forwarding companies from establishing their own freight routes between major cities. Potential factors that students may identify are the reliance of ALTI on their contracted shipping partners to move freight along numerous freight routes that ALTI could not service on their own, the daunting task of quickly scaling a few freight routes into a network of dozens of freight routes should current shipping partners perceive ALTI as a competitive threat and limit service, the difficulty of establishing consistent operations (i.e., driver or mechanical issues), and the potential demand of lower prices from customers should they learn of ALTI's cost savings. Each of these factors demonstrates that despite the positive financial analysis, a major change in business model naturally comes with substantial risk.

TN 4 – A well written memo will include a clear recommendation, results from the NPV and IRR analysis, a brief explanation of the analysis, supporting qualitative factors, and any opposing factors. Students of low risk aversion may recommend against the project and support stable, diminished growth for ALTI. Students of higher risk aversion may recommend adoption of the projects with future similar expansion into other profitable routes. Either recommendation is acceptable when supported by logical reasoning.

