Simulations and Insights From The Enterprise Sales Learning Curve

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Abstract

In 1936, T.P. Wright first described the learning curve theory, in which repetition of the same operation results in less time or effort expended on that operation. While many studies have examined the learning curve under various situations such as manufacturing and customer service, surprisingly little attention has been given to companies for whom learning is an imperative for immediate survival – those companies with very few accumulated resources and therefore little time to learn before organizational collapse. Leslie and Holloway's (2006) "Enterprise Sales Learning Curve" attends to early-stage companies by addressing factors within the organizational learning system, but with a rather static approach to the inherently dynamic learning phenomenon. This paper animates Leslie and Holloway's framework and addresses the key question: "How do early stage companies allocate their scarce resources to accelerate the progress of their sales learning curve?"

Introduction

T.P. Wright (1936) described the learning curve theory in which repetition of the same operation results in less time or effort expended on that operation. While many studies have examined the learning curve under various situations such as manufacturing and customer service, surprisingly little attention has been given to companies for whom learning is an imperative for immediate survival – those companies with very few accumulated resources and therefore little time to learn before organizational collapse.

In their paper, "The Enterprise Sales Learning Curve," Mark Leslie and Charles Holloway (2006)[1] claim that a start-up company's success depends on "sales learning," which is driven by a group of departments facing the customer frontier and working through the issues that arise. Building on other learning-curve theories, they call this learning process the Enterprise Sales Learning Curve (ESLC). The authors identify the factors that shape a company's ESLC, specifically the learning rates of the product development, marketing, and sales organizations, in addition to the overall quantity of learning required to achieve market acceptance.

[1] This research was based on a working paper by Leslie and Holloway which has since been published: Leslie, M., Holloway, C., "The Sales Learning Curve." *Harvard Business Review* July-August (2006) 114-124

Leslie and Holloway's (2006) theoretical paper attends to early-stage companies by addressing factors within the organizational learning system, but with a rather static approach to the inherently dynamic learning phenomenon. Our consulting firm found that customers were seeking a way to use the ESLC framework but also wanted a way to visualize the impact and dynamics of the ESLC, especially around the decisions of how fast, and when, to hire salespeople. Therefore this research has focused on developing a tool that will help companies answer the following question: What is the shape of our ESLC, and what effect do different hiring strategies have on the shape of our ESLC? Over the course of the research engagement, that question evolved to: "How do early stage companies allocate their scarce resources to accelerate the progress of their sales learning curve?"

The Learning Literature and Sales Learning

Yelle (1979) summarizes the learning curve literature from World War II to the present and provides the following mathematical function for learning curves:

$Y = KX^n$

Where:

Y	=	The number of direct labor hours required to produce the Xth unit
K	=	The number of direct labor hours required to produce the first unit
X	=	The cumulative unit number
n	=	Log ø / Log 2 = learning index
ø	=	The learning rate
1-ø	=	The progress ratio

Yelle (1979) adds to the literature by summarizing the various geometric versions of the learning curve and discussing its different applications throughout the organization.

Argote, Beckman, and Epple (1990) conducted a study analyzing the persistence and transfer of learning of Liberty ship production in shipyards during World War II. The authors concluded that knowledge acquired through production depreciates rapidly, and showed little evidence to support learning transfer after the shipyards had begun production.

Other work on the learning curve has focused on investigating the various types of information processed and the different ways in which organizations learn. Daft and Lengel's (1986) main contribution to the literature is in describing the reasons that organizations process information – to reduce uncertainty and equivocality. Daft and Lengel asserted that uncertainty is related to an absence of information, while equivocality relates to ambiguity and a lack of understanding about the information needed. Their work is vital because they emphasize that new data may not resolve anything when equivocality is high. The authors also provided several structural mechanisms for reducing both uncertainty and equivocality. Argyris (1990) distinguishes between single-loop and double-loop learning, related to Daft and Lengel's concepts of uncertainty and equivocality. Single-loop learning solves the presenting problems by reducing uncertainty. It does not reduce equivocality by addressing the issue of why these problems existed in the first place. Double-loop learning questions the values, assumptions and policies that led to the actions that created the problems in the first place; if people are able to view and

modify those then a reduction in equivocality takes place. Adler and Clark (1991) developed a learning process model that incorporates single and double-loop learning in which they conclude that double-loop learning can disrupt as well as facilitate single-loop learning.

Leslie and Holloway (2006) define two types of salespeople critical to the Enterprise Sales Learning Curve: the "Renaissance sales rep" and the "coin-operated sales rep." The Renaissance sales representative is able to facilitate broad-based learning by the enterprise and is extremely resourceful, able to develop his/her own sales model and collateral materials as needed. Renaissance representatives bear resemblance to what Daft and Lengel (1986) describe as integrators, liaison personnel that transmit data within the organization to reduce ambiguity and uncertainty. Likewise, Senge (1990) contends that the leader's responsibility in the Learning Organization is that of a designer, teacher, and steward who can build shared vision and challenge prevailing mental models. In other words, leaders are responsible for learning. The coin-operated sales rep is goal-oriented and able to efficiently apply the available resources. One of Leslie's and Holloway's key insights is that, for early stage companies, hiring more coin-operated salespeople does not speed up learning; it just consumes more cash.

Methods

In overview, our method consisted of using system dynamics modeling and simulation to operationalize the ESLC theory. Our model was conceptualized by inferring from the ESLC theory causal relationships that generate organizational learning. Model development proceeded by iteratively simulating various parts of the organization and its learning processes. Results were compared with the ESLC theory and the literature on learning to determine both whether the model was consistent with the ESLC theory and to confirm that the model was accurately representing its theoretical underpinnings on learning. Actual data from companies were collected from interviews conducted by ABC Company[2], and led to additional revisions of model structure. This process was repeated until our consulting firm and ABC Company agreed the model adequately represented the organizational learning process related to sales.

[2] ABC Company is a pseudonym for the actual firm.

Operationalizing the ESLC

Figure 1 is a causal loop diagram illustrating our firm's understanding of the learning process described by Leslie and Holloway (2006). The processes underlying sales learning are dominated by reinforcing feedback. Sales function readiness levels increase productivity rates, which allow salespeople to have more contacts in the field. From these interactions, salespeople discover the need for more learning, but there are delays and resource allocation demands that must be addressed before learning can be distributed throughout the organization. Depending on the organizations' current readiness levels and their ability to learn, hiring coin-operated sales staff may just increase the backlog of needed learning. By hiring Renaissance salespeople, the organization is able to increase its readiness levels at a faster rate. As the organization becomes centered on learning, its readiness levels increase exponentially, allowing salespeople to be more successful in the field. It is at this point that the sales organization can decrease staff allocation to the learning activities and begin hiring coin-ops.

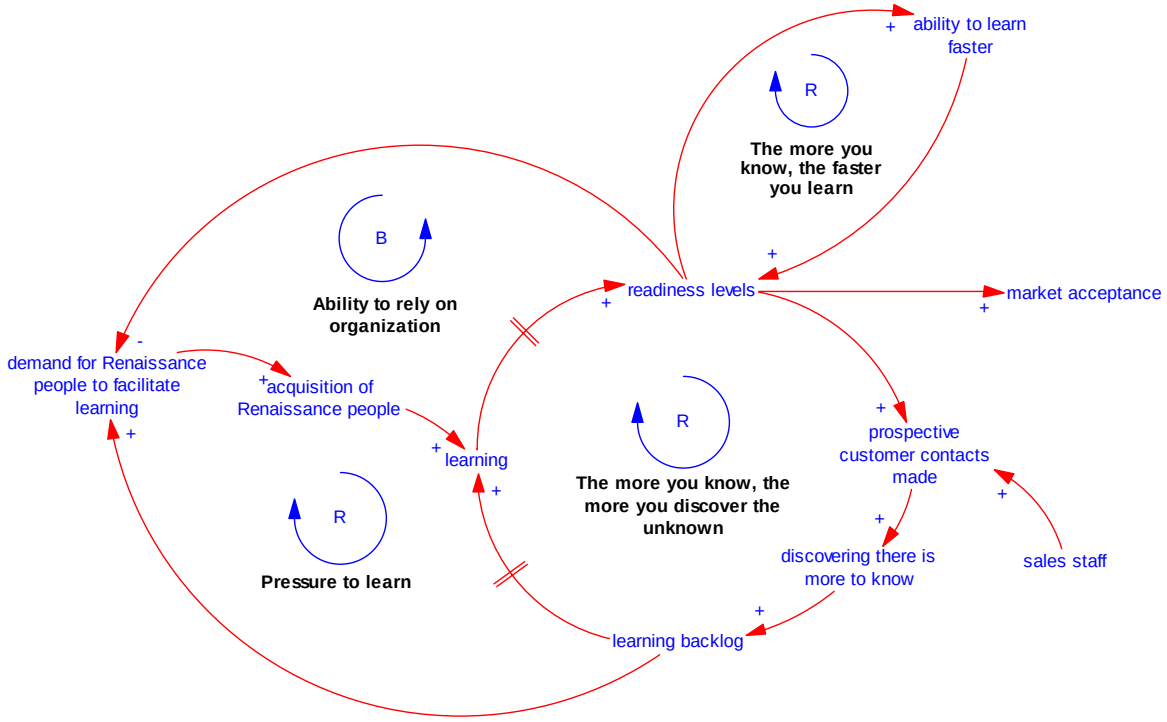

Figure 1: Representing the sales learning function

Figure 2 depicts the customer pipeline of a software company using a stock-flow map to show the process of a potential customer becoming a customer. This map unpacks all the activities represented by "contacts made" in Figure 1. Contacts are moved from one stock (portrayed as boxes) to the next through the activity flows (portrayed as pipes with valves). Sales activities include giving demonstrations, convincing customers to pilot the product, and closing sales. The second part of the diagram in figure 2 represents that each sales activity (only the sales activity of giving demos is shown, but the structure is replicated for each sales activity) is a function of current readiness levels, productivity rates, and the allocation of salespeople to the activity.

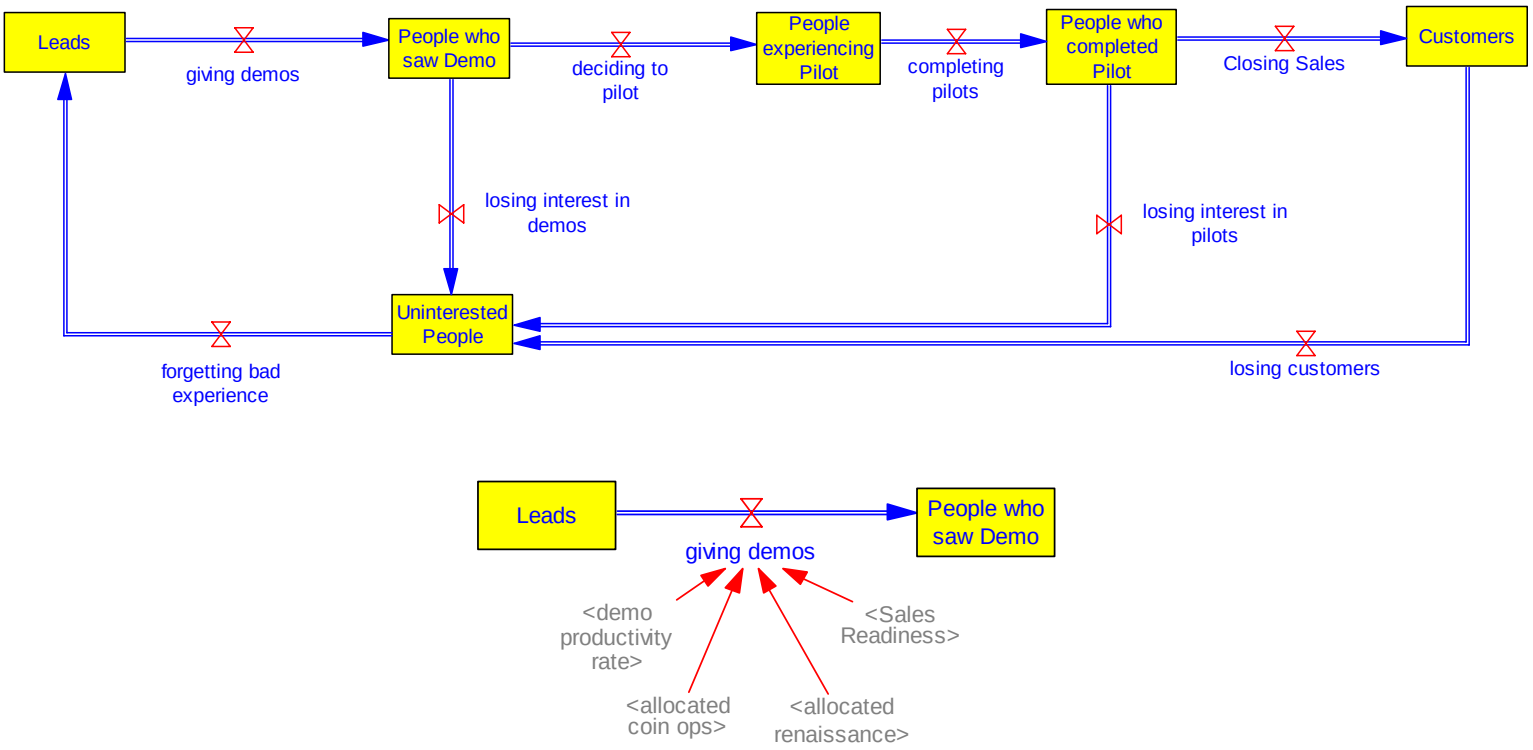

Figure 2: Customer pipeline

Transferring Learning to Readiness Levels

Figure 3 illustrates how individual learning is captured and transferred to the sales function readiness levels (in the illustration, only product readiness is shown). The stock-flow model reveals that organizations must do more than hurl salespeople into the field to progress along the sales learning curve. Staff needs to be allocated to interpreting, processing, and transferring knowledge to other areas of the organization's sales function. Because Renaissance representatives are better at reducing ambiguity and serve as "integrators" (Daft and Lengel, 1986), the model awards Renaissance representatives with higher productivity rates around the learning process.

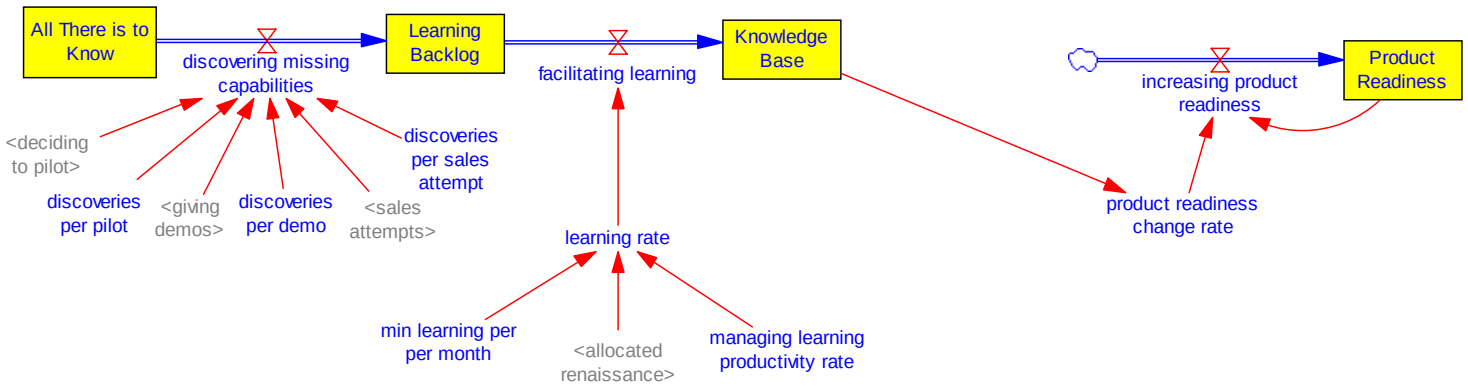

Figure 3: Transferring Learning to Product, Marketing, and Sales Readiness

Dynamics of the ESLC

In the base scenario, there are no Renaissance salespeople and the hiring strategy is to only hire more staff if and when breakeven is reached. The rationale for this scenario stems from the common misperception that sales learning will occur without effort to preserve it. The model allows us to specify the priorities of the various sales activities. Under an equal priority allocation, the model will allocate resources proportionately to activities according to their demand. Demand for each activity is calculated by the number of contacts in the preceding stock divided by the productivity rate for that activity. Allocating equal priorities across all sales activities (Figure 4), the upstream activities get early priority over the downstream activities since there is more work needed near the front of the pipeline. Early stage companies often find themselves in such a dilemma, under pressure to allocate as many resources as possible to product demonstrations and customer pilots (because these activities are in high demand by prospective customers), even though they know that sales result only from converting mature leads to closed sales.

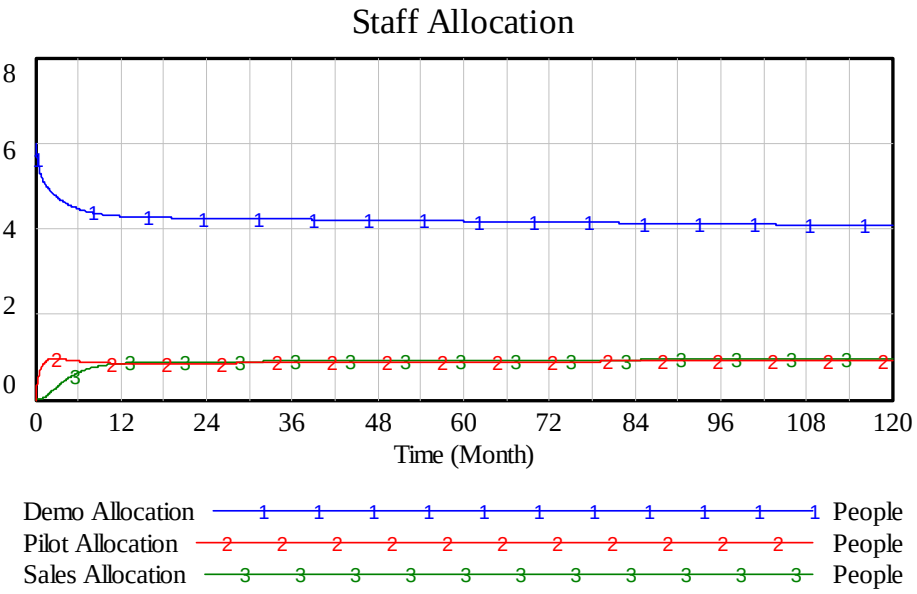

Figure 4: Equal priorities of Staff

Figure 5 shows a scenario in which downstream activities receive higher priority than upstream activities, with the result that more sales are closed.

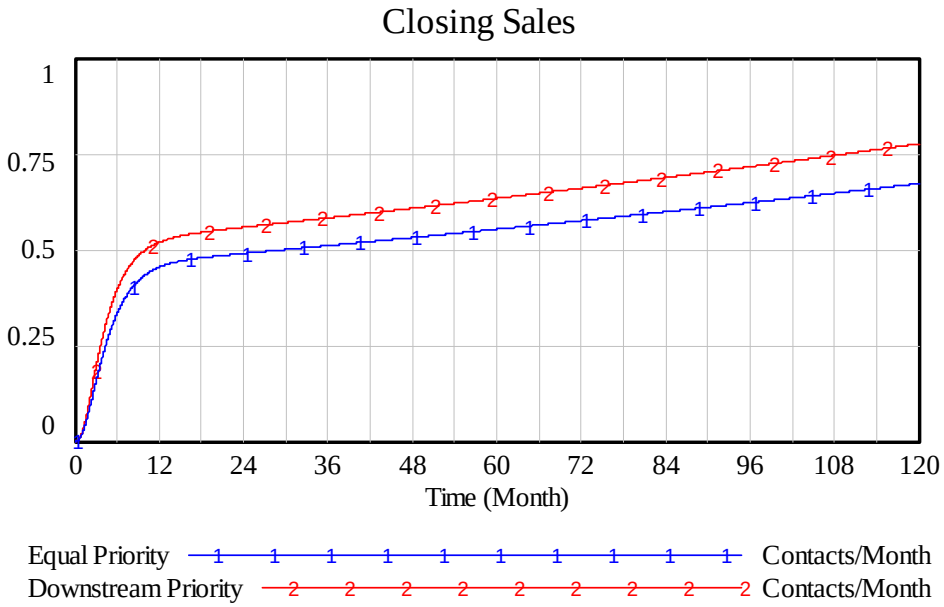

Figure 5: Changing sales from a shift in allocation priorities

Scenarios

We explored the following scenarios in both early-stage and mature companies:

- Scenario A: Hiring coin-ops prior to breakeven
- Scenario B: Launching a major marketing campaign
- Scenario C: Hiring Renaissance salespeople, then hiring coin-ops after breakeven

Simulating Scenario A: Hiring coin-op sales reps prior to breakeven

In this scenario, the organization hires six more sales reps than the base case while still in the "initiation phase", (Leslie and Holloway, 2006). In this simulation, the company collectively closes more sales but actually burns through more cash. Hiring these people increases the net number of sales made, but since the salespeople aren't closing enough sales to cover the costs to the company, more cash is burned with each hire. Hiring coin-op sales reps also increases the rate at which the company discovers what it doesn't know, since more people are working at the customer frontier, but none of the sales reps have the time or expertise to acquire or disseminate new knowledge throughout the organization. As Figure 6 portrays, in this scenario, the additional sales resources create a modest increase in the rate of closing sales (nearly 1 sale per month after 10 years), but the cost to the company is severe. As a consequence, hiring coin-ops at this stage is ill advised.

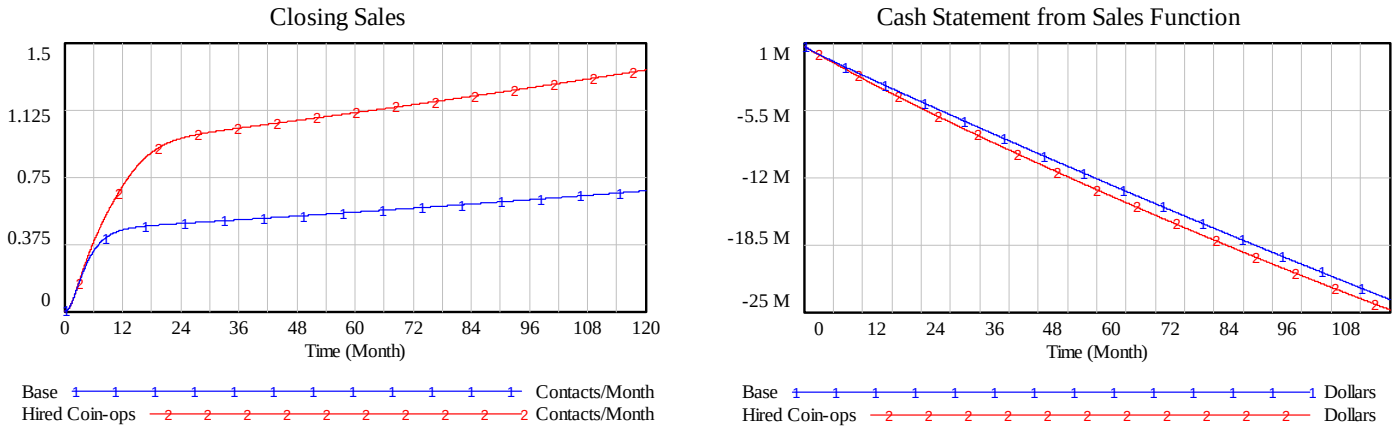

Figure 6: Hiring Coin-ops prior to breakeven

Simulating Scenario B: Launching a major marketing campaign

Another commonly held belief among early stage companies is that initiating a major marketing campaign will increase sales figures. In this scenario, we doubled the monthly marketing expenditures from $10,000/month to $20,000/month. In the simulation, leads are generated rapidly – so rapidly that salespeople are not able to get to them (to conduct demos) before the leads go cold. In addition, the demand for the salespeople to meet the leads pulls them away from closing-sales activities. As depicted in Figure 7 the result is fewer sales than the base scenario, and as a result less cash. Increasing marketing spend has no impact on learning rates, which is what drives the success of closing sales.

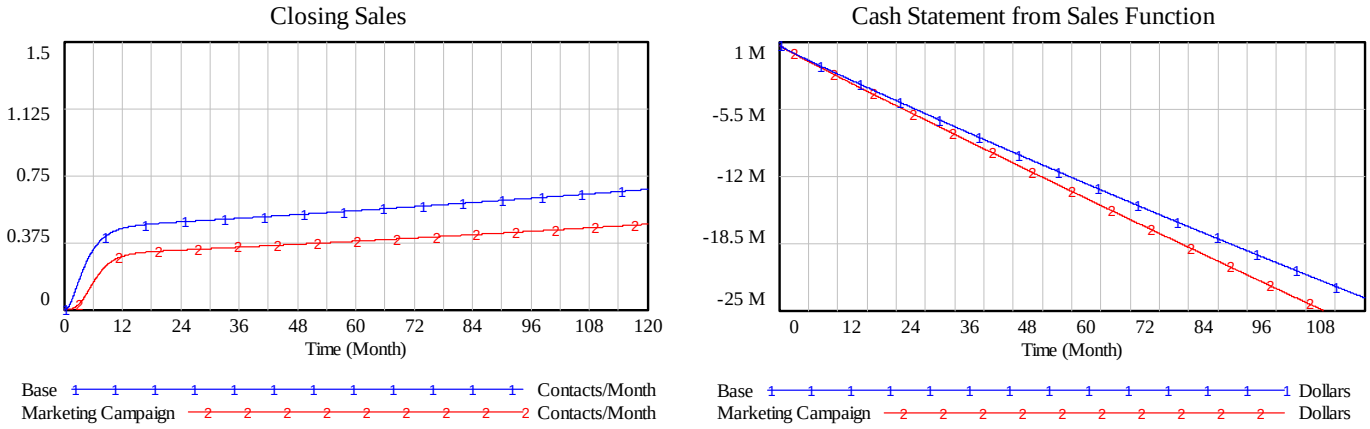

Figure 7: Launching a marketing campaign

Simulating Scenario C: Hiring Renaissance salespeople, and then hiring coin-ops salespeople after breakeven

We ran a series of simulations to identify points of leverage to accelerate the learning and produce optimum sales results. We found that hiring Renaissance salespeople (people capable of facilitating learning) and prioritizing their allocations not towards closing sales but toward the

facilitation and diffusion of learning to the rest of the organization yielded the best results. By limiting the sales force to two Renaissance salespeople during the initiation phase, organizations limit cash burn rates and capitalize on learning, effectively reducing the duration of the initiation phase. In this simulation, as soon as the company's sales function achieved break-even, it began hiring coin-op sales reps and allocating them near the back-end of the pipeline.

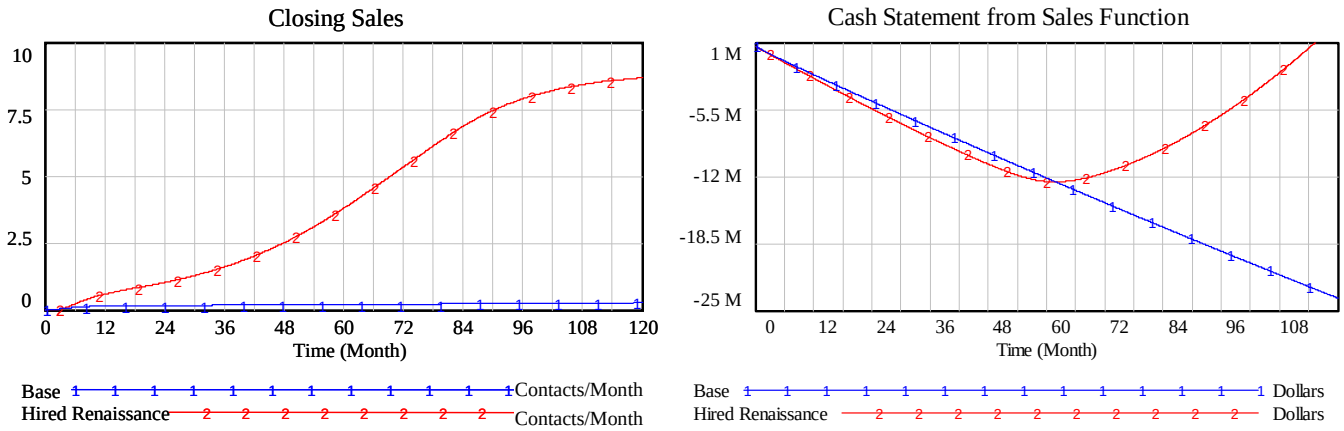

Figure 8: Hired Renaissance salespeople to facilitate learning

Figure 8 suggests that "closing sales" demonstrates s-shaped growth, as do the sales function readiness factors in figure 9 under the same scenario. Notice, also, that cash makes its turnaround near the same time (month 60) as the inflection point of closed sales. This represents the point of sales rep profitability resulting from the organization disseminating learning effectively. More coin-op sales reps are hired because they can create positive cash flows.

Simulation Results of Readiness Factors

Readiness levels are primarily affected by the ability to learn and distribute that learning throughout the organization and are used to drive success ratios for the activities in the sales pipeline. The readiness levels are scaled from 0-1, with a score of 1 meaning that the organization has learned all there is to know (of course, they never quite get there). The main levers influencing these readiness levels are hiring Renaissance salespeople and determining where in the organization they are allocated first. In addition to performing the coin-operated salespersons' tasks, Renaissance salespeople also have to manage the feedback coming in from the field and filter it as they disseminate it to the rest of the organization. The graphs for the learning curves illustrated in figure 9 indicate that the fastest way to accelerate sales learning curves and achieve market acceptance is to hire Renaissance salespeople and allocate them more towards sales learning, rather than to closing sales. Of course, some time is needed to discover the unknown in the field, but the bulk of the resources should be placed on learning.

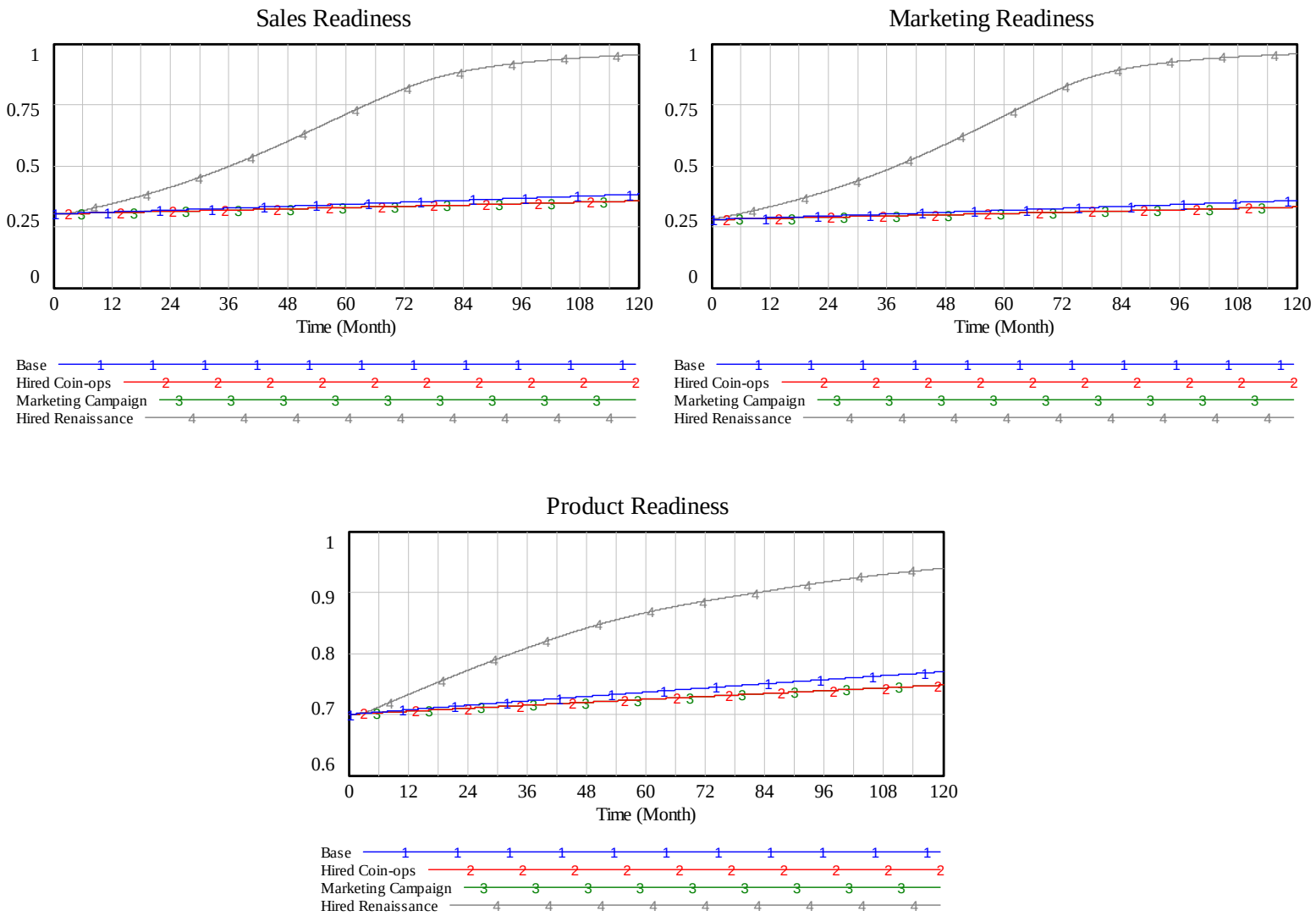

Figure 9: Sales Function Learning Curves

Key Findings

The research to date suggests that it always takes longer and costs more because managers of early-stage companies often make the following policy errors:

- Allocating resources upstream in the pipeline when downstream allocation would be more lucrative
- Thinking learning will take place both instantly and without effort and allocation
- Hiring too many "Coin-operated" when it should hire "Renaissance" salespeople to learn from prospective customers and develop learning infrastructures
- Incorrectly timing the hiring of "Coin-operated" salespeople, who do little for sales learning

One of the main bottlenecks we discovered in the customer pipeline occurs when early-stage companies fail to strategically allocate their resources. In "Scenario B" the company spends additional money on marketing and faces pressure to meet its leads at the early stage in the pipeline, leaving very few resources to meet contacts at other stages. Because leads can "go cold," spending additional funds to generate leads that cannot be pursued by salespeople is like pouring money down a drain.

Start-up companies require Renaissance people who are capable of reducing equivocality by managing and diffusing learning throughout the sales function of the organization. Learning is not an instantaneous event, and it does not happen without the allocation of specific resources. Sales staff allocation decisions are critical to managing the learning rates and to generating revenues. These decisions can be especially difficult in cases of startup companies that may have only 2 people to allocate across up to 10 or more tasks.

Hiring only a few Renaissance salespeople and allocating the majority of their time to reducing ambiguity about the sales function appears to be the most robust strategy, leading to profitability around month 65 of the simulated scenario. Once the organization has achieved readiness levels that will allow their salespeople to be successful, it can begin hiring coin-operated salespeople, and continued profitability is assured.

Limitations and Conclusions

The research findings to date are limited by customizations of the model for two companies. The insights from the simulation analyses are also limited by our assumption that learning is always beneficial to a company; in reality, people can learn behaviors and hold to beliefs that are counterproductive to their work. In future work, we would like to scrutinize the quality of learning, with continued focus on hiring policies and factors that may be detrimental to organizational sales readiness.

For early-stage companies, ignoring the significance of learning curves can create and exacerbate risks to achieving breakeven. After analyses of multiple simulations, findings to date refute the common beliefs that deploying a large sales force or significant marketing expenditures is the key to achieving breakeven more quickly. Instead, the analyses suggest that the highest points of leverage in achieving breakeven lie in implementing policies that encourage learning – not increasing revenues – and the proper allocation of human and financial resources that focus on facilitating learning.

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