

Technology Change in Small Business -- A Case Study

Carl D. Bowling, Ph.D., P.E.

Abstract

While we would not normally think of a small manufacturer of simple toys being particularly "high tech" or their products containing or requiring a lot of technology, technology is increasingly important in order to compete in today's environment. In this case study, we consider a series of options set out to meet competitive pressures and take into due consideration the results of market research. These options include modernizing manufacturing processes, expanding the product line by including more modern "computerized" vehicles, expanding the market by selling to the chains and large retailers, expanding the market through an e-commerce approach, buying another smaller toy manufacturer and integrating their product lines, or a merger with another manufacturer. All of these options have varying kinds and degrees of technology implications. Each of these options requires the evaluation of technology to determine how or if an investment in technology would be wise.

1. The Case: A Small Manufacturer / Distributor of Children's Toys

Assume that you own a small business that manufactures and sells a line of children's toys and collectibles. This is not a business that you would normally think of as being "high tech" or an excessive user of high technology. For this example, let us assume that your line consists of small wooden cars, trucks, and trains as well as a line of plastic accessories to go along with them.

Your company sells mostly to small mom and pop toy and gift stores throughout the United States and Canada with a relatively small volume shipped to each store. You have noted that as the larger toy and discount chains take business away from and push the smaller retailer out of business your orders are falling. You have concluded that it is time to do something to protect and possibly grow your small business.

We normally would not think of a toy manufacturer like this as being "high tech" or a containing or requiring a lot of technology, but in order to compete, technology will likely play an important role.

After careful deliberation, market research, and thought you have concluded that your options are limited to one or more of the following:

- Modernize your manufacturing
- Expand your product line by including more modern "computerized" vehicles
- Expand your market by selling to the chains and large retailers
- Expand your market by building your own web site to advertise and possibly sell your products directly to the public
- Buy another smaller toy manufacturer and integrate their product lines into yours
- Merge with a similar sized manufacturer
- Sell the business to a larger manufacturer

All of these options, with perhaps the exception of the last one, have varying degrees of technology implications for you. Each will require the evaluation of technology to determine how or if an investment in technology will pay off. Lets take a little closer look at each of these options and at how technology assessment plays a role.

2. Response to competitive challenges: the options:

2.1 Modernize your manufacturing

The intent here is that by modernizing your manufacturing you may be able to lower your costs, improve product quality, improve your margins, and perhaps get a larger market share. What is modernizing? You would expect that it has something to do with automation of the manufacturing process.

At this point, you call in a sales-consultant to give you an idea of what it will cost and what it will do for your company. Your only contact is with a sales person that makes his or her living from selling his or her product to manufactures like yourself. He or she may not be selling you what you need; on the other hand, they are selling you products from the line that they represent. This person is knowledgeable about the products that they sell and about your business, but are they providing you with the best solution?

- Automation is not always a better solution. You should be asking some questions:
- Do you understand what the sales person is offering and do you know if there are any alternatives?
- What are the maintenance and staffing requirements of the new machinery? How does this fit with the equipment and people that you already have?
- Is the equipment using the latest software and techniques that available in industry?
- If your product line changes, will this new piece of equipment change along with it?
- Is it your best, most cost effective option?

You should ask many more questions concerning the outlay of funds for new equipment. It is a big expense and you need to know that what you are getting is what you need, not just what someone has to offer.

2.2 Expand Your Product Line to Include "Computerized" Vehicles

This one is probably the most obvious of the options listed for requiring consideration of technology. You see the term "computerized" and you immediately think of an expanded role of technology in the toy itself. You may not realize that technology has an expanded role in both the development and manufacturing processes as well as the product itself. As used here, computerized can take on several possible meanings with respect to toys, but for simplicity we will restrict it to the following:

- Voice control: The toy car would respond to voice commands of stop, go, right, left, back, forward, etc.
- Voice generation or playback: The toy car could tell the child that it is time to make a stop at a gasoline station, time to check under the hood, time to change tires, or many other activities that will engage the child.
- Voice interaction: The car would be able to understand simple commands and provide information about its state. The child might, for example ask, "How's our gas" and the toy might reply back with "Still have half a tank Tommy".
- Remember a path: The car could be "programmed" to follow a desired path entered by the child or selected from a series of predefined paths.
- Obstacle avoidance: The toy could be set up so as to avoid running into walls or other objects placed in its path.

You could probably come up with a number of additional variations of your own of how electronics could be used to increase the desirability of the toy. All of the listed options involve the inclusion of at least some technology in the toy and the building of the toy, but the level or degree of technology requirements varies widely among the choices. Voice interaction is the most technologically intensive, requiring both voice recognition and speech playback or synthesis. While obstacle avoidance, in its simplest form, would require only minimal applications of technology.

Voice Interaction can be a very complicated process, depending on the level of interaction that is required. Having the toy respond to a few predefined words or phrases is considerably simpler than having the toy learn a child's voice and carry out a multitude of commands. The toy will require a speech recognition module as well as

speech generation capability. The deployment of this type of technology by a small manufacturer would be a major undertaking and would likely involve considerable risk.

Voice control has many of the same obstacles as voice interaction in that the toy will need to react to a simple vocabulary by changing its direction or speed rather than answering back in a voice. If markets are to include languages other than English, additional work may need to be done to produce either different models for each language, or a single model with multi-language support.

Voice generation is the simplest of the listed voice technologies. Computerized chips make this a relatively simple undertaking and inexpensive enough to place in greeting cards. The addition of several languages would not be overly difficult and could be all programmed into the same toy, with the final consumer making the selection. Buttons placed on the toy, timers that would instruct the toy to play a message every so often, or detected motions of the toy, could control the voice output of the toy.

Remembering a path or driving over a pre-programmed path is relatively simple requiring only timing and control circuitry. This is a much simpler task when compared to toys requiring voice input. Obstacle avoidance has several solutions, most of which can be solved with simple, low risk methods.

Each of the new designs requires the implementation of new technologies into your current line of toys, but the level of difficulty of each implementation varies widely with the various options. While the technologies may be new to your brand of toys, it is not new technology, nor is it even new to the toy industry. Many toys now are able to interact with their owner with various levels of sophistication. Knowing your options and the level of difficulty or risk in implementing your options will help you make decisions that are more informed.

Here are some of the technology-related questions that you might ask if this were your company:

1. What are the cost, physical size, and power requirements for the voice recognition/synthesis system? Do we use conventional off-the-shelf batteries or go with an internal rechargeable?
2. Will it fit in with my current product line or will I need to design and develop a new one?
3. How will it affect my production line? What will I need to change? Where in the line do things need to be changed?
4. What additional skills will my employees need? Where will they get them?
5. Are there any additional environmental risks for which I will need to plan?
6. How stable is the system with respect to changes in temperature and humidity? How is it able to handle everyday use in the toy environment? (Children will leave the toys out in the sandbox overnight during a thunderstorm.)
7. How much will I need to develop in house, how much can I buy, and at what cost?
8. What is the turn around time for production? What is the lead-time for parts if I need more?
9. There are many, many more questions that you will need to find the answers to, not all of which are technology driven. But, this does give you a start.

2.3 Expand your market by selling to the chains and large retailers

At first glance you might look at this one and think that since you are not adding technology into your product, or changing the way that you manufacture your product, that you would not have any technology concerns.

This would not be the case. Large retailers may require that you upgrade your computer and shipping systems to be able to interface with theirs so that they may monitor orders, track shipping, and predict future sales. This

type of expansion may require that you completely replace your IT department to be compatible with your new customers.

2.4 Expand your market via e-commerce

Here again a role for technology is apparent. Knowing that technology is required is not the same as knowing what or how much technology is required. Building an Internet presence yourself is a major undertaking with many choices and decisions. Having someone else do it for you may simplify the actual creation of the web site, but it does not relieve you from your homework and due diligence.

Here are some of the technology-related questions that you might ask if this were your company:

1. What size web site do you need? How many different pages do you need? How big is each page? How many hits per day on average will you have? What is the peak page hit rate? How much information do you want to gather and keep about a customer?
2. How much fault tolerance do you need? Two or more connections to the Internet? Two or more backup power supplies? Back up computer if primary fails?
3. What platform and architecture? NT or UNIX based? Intel or other processor based? One Box, multiple boxes?
4. What database? Informix, Oracle, Other?
5. How much bandwidth to the Internet? Modem or ISDN? Fractional T1, T1, T3, Multiple T3s?
6. Where will your content come from?
7. Who will be your Internet provider?
8. What is your backup procedure?
9. What are your security options?
10. Buy the hardware/lease the hardware?
11. Is my domain name (name.com) still available?

This list can grow with as much detail as is needed. Now remember this is only the technology aspect of it. You will still need to do your market analysis, know whom your customers are and how to reach them. This too may require some analysis of the technology. This is a new area in the business world where long-term models do not exist. There is little history to look on for help. You may have seen several big success stories and heard of a few failures, but do you know what each did to propel them forward or push them back?

2.5 Buy another smaller toy manufacturer

Buying another company involves many things, some of which will contain technological issues. Examples include:

- Does the new company use the same accounting software so financial records can be incorporated?
- Are the companies' databases compatible so that you can track suppliers and customers?
- Are the manufacturing methods and machines similar?
- How difficult is it to merge the two IT departments if that becomes necessary?
- What infrastructure improvements will need to be made to connect the two companies?

- Many other questions related to the technology need answers. Other questions will probably be the more important and will determine if the offer will take place, but understanding the technology of the other company will make a difference to the bottom line after the purchase is approved.

2.6 Merge with a similar sized manufacturer

A merger with a similar sized company offers many of the advantages and risks that were cited in the earlier example with a greater emphasis on looking at the technology of your own company in greater detail. Where as buying a smaller company may imply adapting it to fit your company's mold, the same is not true in a merger. Both companies will need to be looked at and the better of the two options selected. A plan will need to be devised to accomplish the replacement, merger, or upgrading of one company's technology assets to integrate with the others. (Reference: Segil, 1996) What, if any, assets can be spun off and what additional resources not in either will need to be added

2.7 Sell the business

Being bought out by a larger manufacturer may not be your option of choice, unless the money is really good, but it is often an option. Many of the things mentioned in earlier sections come into play here as well; the difference being that it will normally become the responsibility of the buying company. While the questions will likely be the same, as the purchased company, you will probably be the one answering the questions and not the one asking them.

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3.0 Concluding Comments

In this case study, we have explored a number of options that could be considered in response to competitive pressures and take into due consideration the results of market research. We note that each of the options discussed, except perhaps the outright sale of the company, requires the evaluation of technology to determine how or if an investment in technology would be wise. Most of the questions posed were quite specific for the case of a small manufacturer and distributor of simple toys. This brief study does illustrate, however, two important matters:

Even situations that one might casually assume to have little or no technology content may, in fact, require the consideration of a substantial number of technology related questions. Questions that should be addressed must be carefully and comprehensively developed for specific situations -- there is no simple fill-in-the-blank questionnaire that would reliably provide the basis for reliable analysis. Both of these matters point to the usefulness of competent independent technology assessments of the kind provided by Beta-Rubicon, Inc.

References

Segil, Lorraine, *Intelligent Business Alliances*, Random House, 1996. pp 3-23.

Contact Information:

To request further information or offer comments to the author, please contact:

Dr. Carl D. Bowling, Ph.D., P.E.

e-Mail: carl@beta-rubicon.com

To express interest in securing the services of Beta-Rubicon, Inc., please contact:

Dr. R. R. (Ron) Goforth, President
Beta-Rubicon, Inc.
21 West Mountain, Suite 123
Fayetteville, AR 72701

Voice: (479)444-8118
FAX: (479)575-7446
e-Mail: email@beta-rubicon.com

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