

Technology Planning – A Reference Document

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Technology Planning

Technology Planning is a component of Strategic Business Planning. It is also dealing with change and inevitable change. As such it looks at the longer-term needs of the business with implications on the human resources planning. This charts a path for the overall direction required while maintaining a fluidity and agility to adapt, adopt and refocus. It is a way of continuing to enhance the capabilities for what the company wants, needs, and will require to be strategically strong and superior in outcomes. It is also integral with technology change and technology management.

This document will be of interest to companies facing a significant transition in their business. It is a complementary tool to confront and plan for predictable, foreseeable, anticipated and inevitable technological changes in operations and business. It is being able to more adequately respond to unforeseen changes or events. It is seeking to enable an advantage to be gained in positioning a direction and where-with-all for being in the right place at the right time because you planned to be there. For the most part, there are generic issues common to all businesses that need to be examined to develop a customized solution for planning the direction for the future. Using a nautical reference: setting a heading, adjusting by tacking (course corrections) and modifying the direction as the horizon continues to change requires a dynamic focused document.

A useful perspective in planning for change is to examine product development and new product development (Appendix B) for strategic issues that will confront the business. The changes that will be imposed or sought will cross all aspects of the business make-up and processes, as extreme as technology to marketing. The effect of technical changes (current, proposed and projected) adds another layer and affects the complexion of the business style, culture, response and resources. The cycle will repeat itself; learning from the previous iteration to accelerate the process, accuracy and responsiveness as speed is becoming a critical success factor.

This is intended to be a working tool for Technology Planning. As such it is presenting an attitude (strategic thinking verses project/crisis actions) required, a perspective to create actions, tools to use to make an implementation plan and examples of situations confronting other businesses. The point of the examples is to present scenarios that require commitment to change and the implementation of plans. Common generic issues prevail in all businesses. The examples draw upon some of these. What is required is a custom solution for each individual firm.

The process that will be detailed below intends to offer an outline based on extensive experience with a wide cross section of business over an extended period. This has ranged from financing and financial planning, to R&D activities and development, in-plant solution issues, human resources and in particular technical human resource challenges and forecasts and strategic planning scenarios and outcomes. A number of

common generic issues exist among all firms. These reference pages included here are an amalgam of these various sources and hence not all of the areas noted are pertinent at any one time. However, periodic review and revisiting of these topics will have some of them come to the foreground while others will recede.

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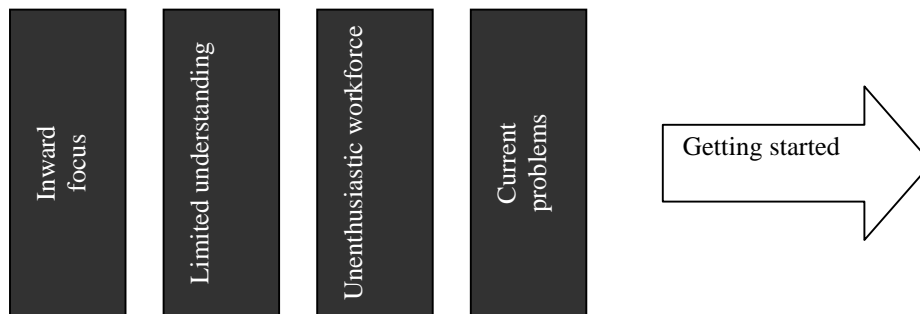
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Illustrations of barriers to and the process for Technology Planning

Barriers to Strategic Planning



From: Quality Centered Strategic Planning by John R. Dew, Ed.D. (Page 178)

The following page depicts the Technology Planning (TP) process to running a Gauntlet. There is a progression through a valley (TP) with a number of tests (left and right sides of the page) along the way that will challenge achieving an implementation. Depending on the company and its status, the so-called tests will be organized in varying order. However, this will provide an overview of the theme for the rest of the document. Take some time to review this next page.

“Building a business is much like building a house: it is much easier when you have a blueprint.”

“The Ability to learn faster than your competitors may be the only sustainable competitive advantage.”

Arie De Geus

Strategic Issues (questions 1 – 5) to be considered (Appendix E)

Where are you going?
&
Where you are going.

Issues that cause stumbling blocks
-Assumptions/Validity
-Success/Failure Characteristics

A useful tool in considering Technology Planning is to examine product development and new product development. (Appendix B)

Create an action plan (2 – 4 pages [you won't re-read anything longer than that]) and possibly a timetable to see conflicts, available resources and desired schedule. Re-organize to make it workable and set priority, flow connectivity

Document/critique

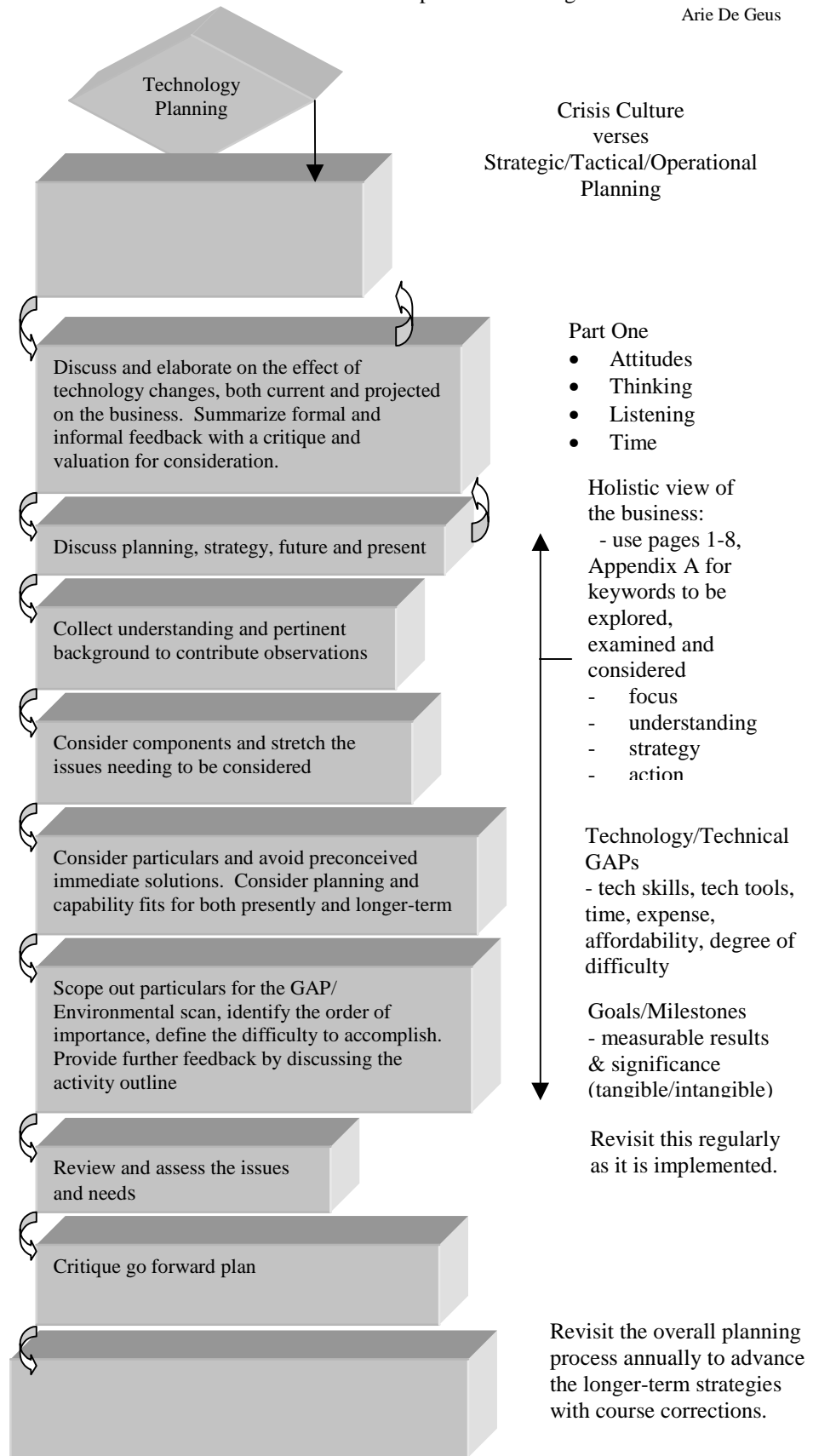
Time chart, team, delegation

Key Success Factors

Business Migration / Leadership

“The *sustainability* of any advantage will depend upon the barriers that exist or can be constructed in order to prevent its imitation and the market in which the advantage is being exploited.”

Michael A Lewis, Warwick Business School



Background:

Businesses face many similar situations regardless of the actual service or product that is produced or delivered to the customers and end users. Issues regarding staffing, sales, output, marketing, product development, accounts receivable and payable are typical examples. These are often accepted as management priorities and have supporting documentation and reporting practices in place because “they are required”. The accounting, legal, banking and other such components for business have become a given in doing business and the cost of performing these functions have been accepted.

Many times firms are in a state of shock when confronted with technology changes. Something crept up in the night and has surprised the company. Often the leap of faith is beyond reach for a variety of reasons, too great of a gap, no one available to deal with the issues, the steps to get ready will take too long and more money than is available, etc. The excuses are the first thing to surface in the challenges that lay ahead.

Why is technology planning a new obstacle? No one has been requiring this. What is it going to do for the business? Planning for technology changes is a component to strategic business planning. This is similar to asking oneself “What do I want to do with the rest of my life?” The company and hence management need to ask what does the company need to be doing now that will increase the chances of survival in the future and what else needs to be in place then that has to be established now. This is being at both ends of the spectrum at the same time to identify a series of paths on the roadmap to set the direction of the future position of the company.

Purpose:

The intention of this document is to provide a residual reference from our Technology Planning activities. This has been an outgrowth from the Technical People in Industry program from 1988 to 1998 and the Technology and Quality Solutions service during 1998 to 2000. Over 350 companies have been engaged and challenged to consider issues regarding technology change and how to manage it. It has encompassed technology change, technology planning and the management of technology change. The term *technology* is considered in the broadest context. It includes processes within companies, how they can be enhanced, understood, applied, managed, as well as determining GAPs within operations and how they can be assessed, compensated for and introduced. The components will identify tools that can be used in the process of Strategic Technology Planning. The components that will be explained have been developed, applied and improved through applications with companies in many and frequently diverse sectors.

Part One: Attitudes and Strategic Issues:

There are a number of strategic issues confronting businesses. They are elaborated below. These have coalesced from a long involvement with small and medium sized businesses. They are considered to be essential components for business planning and a reflection of the attitudes and culture present in firms. When management considers these at the initial stage of Technology Planning, frequently it is as a superficial and/or casual synopsis. Usually these will be revisited again and again to determine

course corrections for what is significant for the company. Maintaining the answer to these questions on two pages (Appendix “E”) has a couple of purposes. If it takes more than that perhaps the issues have not been considered sufficiently to provide a concise summary; if it takes less than that maybe the issues have not been considered enough.

The issues or questions are:

- What will make the company **earnings** in the future and will it be sufficient to sustain and grow the business? What are the **trends** known now for the direction that the sector is likely to experience?
- What are the **processes** that have to be considered to make the above possible? In what manner is the information and the methods to be employed going to have to be provided and made available to make the business **decisions** then?
- What type of **flexibility and agility** is going to be required to cope with customer demands and competitive pressures?
- What do you foresee as the changes that are going to have to start now and require **time (investment)** to enable it to happen?
- All of these questions transcend the full scope of the business in varying degrees. What **impact will technology change** and its management contribute to the above?

“The Ability to learn faster than your competitors may be the only sustainable competitive advantage.” Arie De Geus

“The *sustainability* of any advantage will depend upon the barriers that exist or can be constructed in order to prevent its imitation and the market in which the advantage is being exploited.” Michael A Warwick
Business School

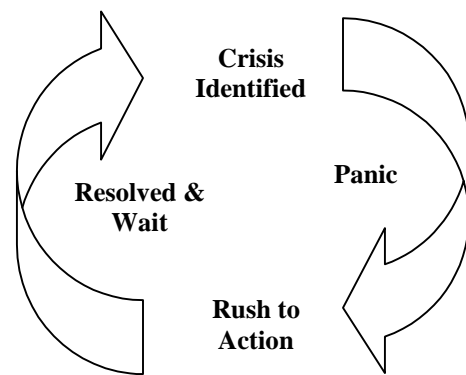
There are some critical issues confronting businesses and their receptivity to considering technology changes as well as more routine planning activities. Those firms that seem to be the most willing to consider the merits of answering the strategic issues questions above are those that recognize they have a ***transition*** occurring in the company’s activities. This is where a company is looking at moving from one level or plateau of business to a new and more demanding scope of business. This is different from moving a rung up the proverbial ladder to where it is a whole floor or more that is transitioned. Hence the term. The view is different, the perspective is dramatically changed and the other players (the competition) are altered. The rules may have even changed. A new grasp of reality is sought and will be significant to how well the business will perform in its changing environment. This may also be compounded with different players that may not be known and it may be only a step in a longer set of moves in adapting to the marketplace.

Another consideration is the ***business design***. In the same sense as we discuss product design and product life cycles the same concerns and requirements exists for the business itself. The internal structure, the staff, the physical assets, the customer base and integration, etc. all comprise ingredients for the company’s make-up and value proposition. Part of the design also includes how the firm is preparing for its long-term survival, its continuity, where-with-all and success measures. This is not applicable to just larger firms but even the single person business. For the latter it can be more difficult to detach oneself and not be overtaken with the daily tasks. The ability to

objectively step back and ask pointed questions regarding the business and its activities requires commitment. The other common issue for all those engaging in Technology Planning is to avoid glossing over the topics. The choices need to be extracted from the back of ones head, explained and exposed out loud and then they can be critiqued for their worthiness. They can also be prioritized and considered for actionable results as well as the extent of the gap that may exist in undertaking the challenge. Certainly one is the ability to afford the project(s). However, that doesn't mean that you necessarily abandon the process; it may prepare you to identify other opportunities when they become more accessible.

Another culture issue in companies is whether they have a mind set to allow longer-term thinking, *strategy*, to occur or if every issue (and only the most pressing issues) is treated as a *project* that requires fire fighting. Those who are of the latter perspective will tend to want immediate solutions and in some cases want answers to current capital purchasing decisions for instance that are not part of the strategic goals.

A crucial threat to the process is that of *assumptions*. These are those things that are reserved as untouchable and not available for scrutiny. The speed at which we jump to assumptions and without recognizing that we have done so is at the speed of light. An example of this and perhaps some of the effect of living in the immediate solution culture is an analogue with a bicycle pump I had one time. The hose failed and I went out that following Saturday morning to buy a new hose. After several stops to various businesses to purchase a new hose I was ready to give up. Replacement hoses were not available at that time. I have seen them since. But the most probing question came from the last shop I visited having become reconciled to buying a new pump. The bicycle shop didn't sell hoses either. But he asked what the end of the hose was like and what was the fitting. Before he finished his question I knew where he was going and the solution I had avoided and even prevented myself to consider. I could have repaired the hose on my own if I had only examined the end and the fitting. I cut the split end of the hose off, cleaned out the fitting, jammed it back on and was in business again. This process has been repeated a few times and now the hose itself has become too short. However, the point of the story is that I never even considered looking at the hose for what was really required. I jumped to a conclusion having made an assumption. Fortunately it only cost me a Saturday morning of driving around and getting nowhere in my pursuit. How many times does that happen with other things in business? The hurry to fix the problem prevents it from being examined and in fact remedied more quickly. Another assumption is that no one else is thinking of the same things you are or that there should be any concern for competition. For those who are into or can appreciate sail boating here are two stories. The first is that there is always someone trying to overtake your position. A sail on the horizon is frequently a challenge for a race and to overtake the unsuspecting sailor who is enjoying a comfortable cruise in pleasant waters. A little like "I'm just happy with the way business is going". The other



sailing related story is you pick a direction and take a heading that requires several course corrections (tacks) to adjust for the wind, tides, traffic, shoals etc. Every time you go for a cruise the direction may remain the same (the head of the harbour) but the method will be different as a result of changing conditions. But the point is to get out to an area where you can see more clearly where you want to be going. When you are out there other opportunities will present themselves because you are out there and planned to be.

There are components to keep in mind about successful commercialization projects that contribute and multiply affecting the probability for success. This is the product of three ingredients. The ingredients are the technology, the funds used and the management of the process. Some people will comment that a fourth variable, marketing, exists. However, in my opinion that is a part of management. The technology component considers the quality of the technology: does it work, is it protectable, can it be extended, what is its life cycle, it's niche, etc. The quality of the funds deals with the type of money that will support the activity. This will consider operating funds, investment, debt, tax credits, contributions to R&D, earnings, etc. Having the wrong money for the tasks can jeopardize other prospects. An example is using say a line of credit for capital items. And last is the quality of management. This is referring to the where-with-all in the company, its continuity, delegation and the other aspects associated with management's capability for lateral thinking and to consider flanking actions. In all of these the quality factor has to be approaching as close to "1" as possible. If you consider the proverbial toss of the coin for each of these factors then the best outcome will end up being a 1 in 8 chance for success. If that is where you are starting from why would you spend the effort let alone the money. This view of commercialization has to permeate throughout all of the activities within the company. It is certainly applied with new product development and hedging your bets on the projects that have the greatest potential to succeed and minimize investing in losers.

Factors Affecting Technology Change

Some of the factors we have seen as frequent contributors to failure in the technology change process include:

- lack of commitment,
- lack of understanding,
- intimidation of the technology or change process, tired management,
- a false sense of retrenching to a secure market,
- lack of focus, an unwillingness to focus,
- other solutions with only immediate promise,
- lack of foresighting and lack of team building.

Some of the success features for businesses are:

- team building,
- delegation,
- tangible and realistic goals and milestones,
- appropriate tools to accomplish tasks,
- continuity in management,
- commitment to the process and planning for change,

- lateral thinking to enable continuing advancement,
- champions,
- the drive for a superior product or service,
- frequent review to evaluate progress,
- management's progress in its understanding,
- recognition of results and benefits and a sense of urgency.

Part Two: A Practitioner's Perspective

Strategy and planning deal with actions to be taken in the present. This denotes the parallel and concurrent activities that have to be occurring and adapting simultaneously. The former two are not activities that will occur continuously. But an understanding of where things are going, the direction, have to be understood and charted through the use of an actionable tool or document. It sets the course and has another criteria influencing it. That is time. This wrestles with the perspective of "Where are you going?" and "Where you are going". It is analogous on a personal basis with "What do you want to do with the rest of your life"? This requires finding the time (and it does not have to be excessive amounts of time) to challenge ones own thinking, extract it from the back of your head, critique what is considered obvious and define expectations. Even for a single person operation detaching yourself from the day-to-day tasks to consider the future is important.

In identifying the needs and understanding that is both sought and required for the planning to proceed requires that assumptions and implied insights have to be addressed. If you were to ask someone to go to the grocery store for the next month's groceries, should you be disappointed in what is purchased if that is all you specified? They could have done exactly what you requested but they didn't obtain anything you wanted, because you assumed they knew what you wanted. A more detailed specification of what you like and want would increase the potential to have something "good to eat". The same scenario is required in the plan and strategy aspects. The other thing that happens when this is done is to examine what is really needed and to what extent. For example a company was describing its R&D project list. Included in the list and with the same apparent ranking for serious consideration was a casual project, unrelated to the company's core activities but a curiosity having some merit. Left as presented another staff person could focus excessive attention based on the implied appearance of having equivalent status. This was only a pet project dabbled at by one person as time permitted.

There are some basic issues and objectives in undertaking the strategic planning process. The impact of technology changes that are anticipated, foreseen and predicted are intertwined. This is not crystal ball gazing but similar to driving at night and anticipating where the road is going by seeing the street lights ahead. The structure of the process is to identify technical capability gaps and needs; structure a strategy for its introduction and implementation; set realistic goals and milestones; develop an actionable plan to be implemented and focus the resources to meet those requirements. This is reviewed on a regular interval for progress and adapted to suit adjustments that will happen and continue to advance on the outcomes.

One of the tools to examine these strategic perspectives is to consider the following table and the questions posed within it.

Three Years Ago	Last Year	This Year	Next Year +	Three Years from Now
What were you doing then?	What did you have to do for sales and production goals?	What is happening now?	Where is the market going? What do you foresee from your involvement in the sector and the changes predicted? What are you going to do about it and its impact on the business? What is the effect on products, production, manufacturability, reproducibility, repeatability, materials, specifications, compliance, price, cost? ??	Future new products not yet planned but needing to be ready to respond to and with?
What did you need to do then and did?	How well did this work out and the results?	What is possible from internal means? To do? Can be done?		
What did you need to do then and didn't? And why? Could it have been done? What would have had to have changed?	What did you do about it? Where have you gone from here? Is it still pending? When is it no longer an opportunity?	What requires other events to occur and by whom?		
What was the status for the firm?	What were the demands on the firm and the new competitive pressures? Ramifications on the firm? Sales? Margins? Profits? Cashflow? Products? ?	Status quo? Growth? Why and how? Divest? Diversity? Product extension? Product mix? Product life cycle? Feasibility? Capital limits? ?		

Another tool in examining issues within a business are listed under the following headings:

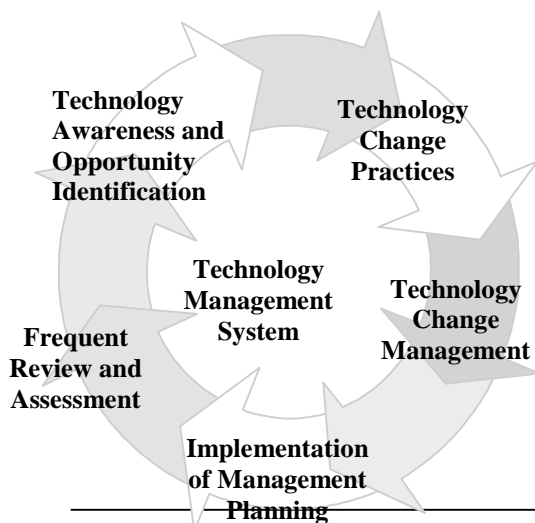
- Overview Summary
- Technology Plan
- Implementation of the Technology Plan
- Human Resources
- Product Development
- Marketing
- Quality Enhancement
- Intangibles

These are detailed further in Part 4 and Appendix “A” for specific components but they are not presented as a checklist. As with each situation in a company some things apply now and some don’t but may later when considering the issues again. The real point of these headings is to remember that the company has to be considered in a holistic manner and not have components isolated and/or disconnected from the whole. Each of these areas provides an influence on each of the others and with an increasingly changing world affected by technologies and technological change the inclusion of a technology related component is ever more important to that adaptability of the firm. We have frequently observed that management spends little or no time on this aspect of their business. One of the other assumptions often noted of companies is when technology or technical skill are required they will be readily available. Unfortunately, there is no one waiting on the street to fill that gap. Additionally, the lead-time to ramp the capability up to speed may cripple or prevent the opportunity from happening. This then emphasizes the planning and strategy aspects of the technology change process.

The time to think of, explain, discuss and respond to challenges about the company’s future is hard to find. However, this does not mean that it has to be extensive periods of time and exhausting meetings. In the same sense as you might spend up front time in considering the merits of a new product or service without expending hard funds for components or other design the think time is similar to the soak cycle in the car wash. The issues have to be brought to the surface, exposed to a solution that will raise the dirt particles, a time for that to penetrate and then rinse to see the true colour and properties of the surface. The greatest temptation is for management to apply a project management

regime of “what’s the problem, what will fix it, get it done”. The think time (soak cycle) when nothing is written down but time is spend discussing and bringing a focus to the direction and heading is critical. It is hard not to do a to do list. But if that occurs the danger is that fixes will be identified and pursued rather than seeking root or base situations and finding solutions that will exceed a fix remedy.

This process when completed will be repeated and examined to improve the process from the learning that has been accomplished. It is not intended to



be confining but enabling for the management and company. The illustration to the left is intended to denote the steps and stages in the process of managing technology changes. This is similar to other processes such as quality improvements, new product development, marketing strategies and others that go through building blocks to up a notch or level to another plateau.

The point of all the thinking and exchange of issues and detailing is to construct an action document. The bulk of the material that is generated in the formulating mode is to be filtered for an implementation document that is not more than four pages long. There may be some attachments in the form of a table or two but the basic output to be a tool that is reviewed regularly and modified as things progress is still only four pages. This is a strategic document that will respond to the following:

- a concise perspective of the future envisioned (Vision)
- technological changes that have to occur to make it possible
- a progression of actions that will build to make that happen
- a starting point with the right heading
- a clear understanding of the challenges facing members of management
- delegation of the tasks and responsibilities
- a timetable
- a method to review and monitor/measure progress (indices for intangibles)
- revise and adjust
- perform post mortem

Part Three: Implementation - Putting the Technology Planning Process in place

The previous discussion has been to set the tone of issues to be addressed, the attitude and culture that needs to be present in the management team to be receptive to the requirements for the business' future. The perspective from the practitioner view is to add further complexion to the task at hand. Through the parts 1 and 2 a variety of demands and scenarios have been raised that now need to be consolidated into a focused, concise product as a measurable deliverable that implements a strategy immediately on completion. Procrastination at this point makes the effort a nice exercise if you had the time but it is essentially a waste.

“Successful interpreters usually possess an ability to recognize relationships between sets of information; ... and a willingness to make decisions with less than complete information”

George Kress

The choices have to be critiqued for their merit and how they will contribute to the future that is forecast. There is a distinction between forecasts

and projections. Forecasts are those events that management can influence and control while projections are dependent on assumptions that may or may not happen. There is also a need to interpret the trends that are known, consider events that are reasonable and realistically due to happen and those that are possible. This is a little like driving at night; you cannot see the road but the street light indicate where the road is leading, thus you can anticipate with reasonable confidence where you will be going. It does not however, indicate obstacles in your path and you have to remain alert to adapt to hazards and be

responsive to change direction, stop, accelerate or any of the other choices that will be required to flank the impediments that lay ahead. What this is striving for is a Focus on the type of company that will need to evolve, to have a presence in the market that is sought and planned for. This also requires a review of the business' mission and vision to provide that concise Understanding of what are the unique and superior features in the firm that provides a niche that can be exploited. It can also include barriers that are able to be established to limit or restrict competition. This could be a new product or service but it may also represent an internal structure and/or competencies that offer advantages. Consideration of how to maintain leadership and to practise foresight for evolutions in the product/service application, performance, information interpretation, are a few of the means.

In describing the future that is forecast and projected, there is a need for clarity, understanding of the steps, stages, milestones and results (connect the dots) and assessment of the components, their order and innovations to flank or leap obstacles. The extent of the lateral thinking for options is important for the adaptability of the firm and its subsequent agility. If there is no thinking about alternatives then the responsiveness by management tends to be stagnant. The grocery store analogy mentioned earlier comes to mind. If the challenge and direction is not understood then the activities will be half hearted at best. This understanding and the focus need to be organized and structured into a Strategy. A concise summary of the strategy into a summary document provides a tool for monitoring, managing and measuring the process and evaluating its frequent review. As someone once said "If you are not measuring outcomes, then you are only practising". The strategy is not a stagnant document but a dynamic instrument for the success of the business. That does not mean that you dwell on it excessively but make it an Action device that will include a timetable, a chart of priorities and an information method for alerting all staff to the time constraints, need for continuous learning, development and consistency.

In asking the following questions within the business context a number of issues confronting companies are identified. These questions are not looking at what needs to be done today to produce products or services but what needs to be done for the products that will be required in the future. This is the longer-term demands that are considering the business model and business cycle. Having identified what is needed in the future then what is needed now to enable that forecast future directions to materialize as reality. It is also firms that are confronted with these questions and are willing to consider solutions who are the most receptive to undertaking strategic planning, the context of technological change and the effects on the business.

- Question 1: Is there a transition occurring or needed in the business? This is exploring what type of business the company will conduct in the future? How dramatic is the change, is it a single step up the ladder or is it moving the equivalent of a whole floor? What is going to have to happen if the latter is the situation? What is the GAP; what are the components that need to be considered to close the gap and in what time frame?

- Questions 2: What will be the effect on product life cycles; how will the pace be accelerated; what can be done and what is required to make a quantum change versus single stagewise steps? How can and will innovations enable these changes to occur?
- Question 3: How will the value of the products/services migrate for the company? How can more value be created, more intimate interactions with customer needs? What else can be included to increase the customer allegiance? Another short story this time about allegiance. A residential fuel oil supply company fixed a potential problem with the outside storage tank for a customer without request from or expense to the customer. That customer had been thinking of changing suppliers (the proverbial greener pastures) for no other apparent reason than never hearing from the supplier. Other than for regular invoicing and furnace cleaning the company was never in contact. The supplier never notified the customer of what they had done and were unaware that the customer had been thinking of changing. They failed to make the allegiance stronger and got none of the benefits of customer loyalty for their efforts. This is a symptom of lack of attention to details that would increase the value for the customer. This can be a symptom of the service group operating without linking to marketing and others in the company. The expenses incurred are not likely measured for benefits and outcomes.
- Question 4: What priority is applied to product development/new product development? How many projects are pending; what is the rationale and what are the feasibility criteria for their selection and the collaboration structure for team development. Is each part of the business represented?
- Question 5: How are the components (the technology, funding and management) for the probability of success for each project assessed to increase the likelihood for effective outcomes?
- Question 6: What constitutes a winning strategy for successful product development, launch and production? How are these conditions evaluated for effectiveness and improvement? How are cost, margins, pre-production, R&D, routine and normal on-going r&d, on time, etc. evaluated for success?

Another layer or overlay in the Technology Planning process is to consider the nature of the corporate culture and attitudes that exist in the firm. An open, frank and unencumbered participation by all members of the various teams avoids hidden pitfalls and often will bring out other solutions and options not otherwise encouraged. A strong, clear and concise understanding to the company's mission and vision will denote the actions that have to happen to achieve the company goals and rewards for all. These ideals have to be tempered with the reality of what is financially achievable. A grand vision without a where-with-all to accomplish it jeopardizes credibility and commitment. The converse is being aware that constraints can become a source of creativity in overcoming challenges; different solutions to avoid or minimize the barriers. Recognizing the merits of the right timing and synergies is significant.

Another layer to include in the Technology Planning considerations is to examine the trends that are likely to occur. This is trying to predict the patterns that are and will be emerging. An analogue with playing a strategy game such as chess or checkers comes to mind. If you are considering only the next move then there is a limited number of plays;

if you are planning for the next two moves then the move you make first will be important and increases the number of overall choices. But if you are looking at say three or more moves ahead the choices take on a different significance and become more numerous and complex. The skill at finessing these requires a rapid recognition of the patterns and the combination of patterns. This is somewhat equivalent to everyone having the same data and information but then a person comes forward who can interpret and extract extra insights that enables him to “read between the lines” and outperform others. That ability is not a casual happening but is trained for and practised. It can become part of the strategic planning.

Frequently there is a mindset that things must remain as they are. The proverbial “rules” of engagement or business. If one watches and obeys these closely then changes made by others are not observed until long after and a disadvantage exists. The other part of that scenario is if you don’t like the rules, change them. This can provide an advantage for the firm that sets the new rules. Some of these changes can represent moving from being just a provider of products or services to becoming more involved with customers/clients and satisfying more of their needs. This provides a complement to the existing products and increases the value/benefits to the recipient. It can also increase the understanding of the additional requirements of the customer.

"People sometimes stumble over the truth, but usually they pick themselves up and hurry about their business."

Winston Churchill

The whole process of strategic technology planning and planning in general is to make a decision that can be acted upon and be beneficial to the firm. The dilemma of planning for the ultimate solution usually results in nothing.

“A good decision today is better than an excellent one tomorrow because it will have changed again and no decision will ever be reached.”

What is important is for the business to examine itself from the perspective of the needs of the whole company and to establish a “Complete Company” response to the future. While generic issues and common themes for business, in general, are nice to discuss there is no value if the planning process does not yield a customized solution that has commitment, resources, a timetable, measurement and action.

"Even if you're on the right track, you'll get run over if you just sit there."

Will Rogers

Part Four: An explanation of the tools to help in Technology Planning (reference for Appendix A, pages 22 – 31)

An attitude for creating a future for the company that is beyond the current year’s projections, ie out of the box perspective is necessary. The time to think out loud and

listen to what is being said will help rationalize the reality of the vision and its ability to be financed.

The components for technology planning have exposed issues for a holistic view of the company. Not all of these topics are going to be applicable at the same time but they need to be recognized and acknowledged with a reason for their inclusion or exclusion. A willingness to recap all of these in a final review before confirming the plan is warranted.

Each of these topics can be exploded into an extensive series of details. Only those most pertinent to the current process should be expanded.

It comes back to the time spent initially considering, discussing, elaborating and filtering for those concerns in planning the future place, position, uniqueness and successes that will create the growth and earnings in the company.

Discussion on the Overview Summary

There is a need to stand back and critique the current operation. What does it have that provides uniqueness and opportunity? What will confront its future (say 2 to 3 years) and present challenges and demands? How will management prepare for these events and what are the new features that will have to be established now to result in being in the right place at the right time because you planned to be there.

Each of the topics needs to be considered and evaluated for relevance at this particular time. Then overlay these thoughts with what will be the effect of technical and technological changes that can be foreseen, forecast, predicted and projected.

Then keep in mind insights known, hindsight experienced, foresight of things to come and could occur while avoiding oversight (never thought about).

Technology Planning is examining what has been the process used to date, its components, effects, results and the evaluation of overcoming the deficiencies that were experienced. Some of the cases or reminiscences cited in Appendix C try to identify some of the real life scenarios of issues confronting firms. These companies tend to be small firms but similarities exist with larger businesses (ie a \$200M business experiences common dilemmas and sometimes because of a larger scale the situations are repeated in various locations and are not dealt with or even appreciated).

Relatively few firms have been identified that endeavour to strategically define the most critical bottlenecks in operations. Some of the tools include sophisticated analytical modelling software.

Another relatively recent demand on small firms involves compliance with EDI (electronic data interchange) protocols with customers. A tangible penalty is applied to the suppliers for non-compliance. One small firm that reluctantly complied with this, at not an insignificant expense, learned that by reading and interpreting the data it could

adjust production and product more effectively and obtained an integral benefit to the operation besides the initial purpose. Now that is how it wants to do business with its suppliers as well.

A question here is whether the introduction of this technology would have been different, faster, more effective etc. if the company had embraced its establishment by examining the opportunities it could present rather than the strong reluctance it engaged and a protracted implementation. How much more could have been accomplished and what effect that could have been on earnings is only speculation now. The parallel issue is whether this is treated as a distraction from business and if the same scenario could be practiced on other parts of the operation. Management has been forced to think more strategically and confront issues that have been foreign to this point. Management needs to grow with the business and enhance its skills and tools for development.

Implementing a Technology Plan

To illustrate this perspective I will relate another reminiscence. The firm was initially considering adding a technical skill, new to the company that would complement what existed. This was to round out the scope of in-house services. The project was to essentially hire a body with a particular technical background and assume it would meet an unspecified need to do useful things in the company. The assumption was that the new candidate would catch on quickly to what the boss had in mind and in his head. The superior was probed for the details, tasks, and reports that would be expected. It became clear that a bit more attention to the particulars would be worthwhile and help avoid misdirection of efforts. The more this was considered and supplemented with questions about what else could be forecast for the future and beyond the current projections it became clear that some big changes were looming. If the new skills were directed to also support and position the company for those tasks a much more successful outcome would be achieved. To make a long story short, a more extensive view of the future enabled the company to introduce new capabilities that addressed a number of concurrent tasks (operational, tactical and strategic) in transforming the company from a producer of a family of routine products to one that is highly interactive with considerably more value added. Dealing with both suppliers and customers provided significantly more value added products, boosting overall volume by at least a factor of 2, resolving a supplier problem for product uptake (that had limited their production) and smoothed both firms production cycles. A number of very positive benefits accrued to the company. Subsequent to the transition and the transformation in the company they have been in the advantageous position of leveraging more benefits, earnings and opportunities. The challenge is to maintain the momentum and forward thinking in an ever-changing marketplace.

Human resources are an area of unfinished challenges and opportunities. This issue in the current context includes examining management's attitudes, support and self-analysis for the needs of the company into the foreseeable future and how to introduce it at a point where the skills are developed and highly effective. Frequently, management applies little or insufficient planning for staff development. The assumption is that skills and technical skills in particular will be readily available when called for. Current known

shortages in technical skills will continue and numerous firms will be at a disadvantage. An option of taking a less qualified skill and growing it into the new activities that are planned enables companies to have affordable skills besides encouraging the creativity that is important for embedding additional insights. The right skills fitting a niche in the management/staff will still fail if the personalities clash (interpersonal skills) or do not perform in a superior manner. Both the human and the functional criteria have to be met and achieved.

Ask candidates to submit a summary of the points made during an interview. This interview technique can be useful in determining the conciseness of understanding the position requirements and the perspective that a candidate will bring. This can have a double edge. A clear concise summary verses a rambling monologue without a focus can tell considerable about the candidates. If everyone fails to relate clearly what was presented maybe the interviewer did a poor job.

Having an ideal specification for a capability is a starting point. Seldom is there ever a perfect match. By having an understanding of the ideal requirements then compromise is possible and retrenchment is likely.

Product development (and new product development) is an area that firms need to become more demanding of themselves for focus and choosing opportunities to follow and commit serious effort. Issues here are elaborated on in Appendix B. It is very easy to have a pet project, unrelated to the main business of the company, become paramount and divert needed management time and resources on the misconception that this is what the boss seems to want. A rationale for why a project will be considered and then a consistent and repeatable process for evaluation offers a regiment to maintain consistency. A small firm (9 people) we know developed a process to do new product development and it was very successful with product launches and rollouts. But one of these failed miserably. When an analysis was completed on the failure, the same as for successes, they found that they had taken a number of shortcuts because they felt they could skip some of the components. They failed to consider what became obvious and significant gaps and flaws in the product idea, design, need and customer input. They did not let themselves experience that weakness again.

Marketing

Often marketing and technology are kept at opposite end of the pendulum swing. All aspects of the company's where-with-all need to become more integrated to appreciate and share the common goals of the firm. Often the same processes are engaged for technology plans as would be in a marketing plan. The terms are different, the sources for data will vary but the process is generically similar. This is similar to talking of cross tabs in marketing data being equivalent to correlation in engineering jargon.

Foresight in the marketplace and changes being experienced therein combined with foresight in the technical evolution or revolution can collaborate to provide even more leverage on the output and outcome. The transition encourages understanding without

internal competitive challenges. This is dependent on the company culture of helping others to perform in fact helps all and the company itself to outperform.

Quality Enhancement

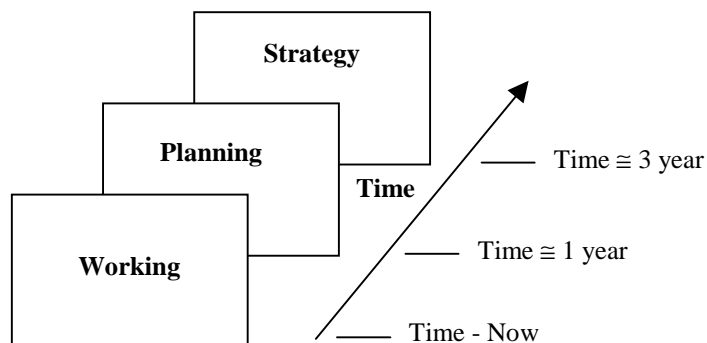
Every company makes a good product. If there isn't at least that belief then how could you sell anything? Some others would argue low cost is poor. But it can still be a good product for that price. The problem with competing on cost only is someone will continue to try to be cheaper or less expensive. That competitor may not be in business for long but they can seriously affect the market temporarily and jeopardize others to survive the interim period. Many examples exist of firms dying because everyone got their fair share but not enough to generate earnings for growth, development and success.

The point is to enhance what exists in ways to improve the process, reduce costs, introduce different, better or newer techniques. This can lead to having an edge, for example in the IT field, a more insightful interpretation of commonly available data.

A substantial ingredient to the quality enhancement is the attitude to change and changes that are well understood.

As the Knowledge Age is discussed more and more, the significance of it can become diluted as to its real meaning. Internal structures, capabilities – shared and collaborated, external structures and communications become more important. Intangibles become more pronounced in the success that can result for firms. They have to be understood and properly tapped to achieve success for all.

Strategic planning with strategic technology planning as one of its components, is an activity that occurs first in the head and operates in 4 dimensions, all concurrent. They are 1) working on today's projects, 2) planning for the forecast period (ie projections for the next year), 3) strategizing for a position in the future (out of the box thinking) and 4) influencing all stages is the time factor of urgency, agility, adaptability and inventiveness or innovation.



Appendix A

Issues to be considered for a holistic assessment of the components for the Technology Planning Process.

(This is not a series of templates to be filled in but a number of issues that have to be considered and decided upon in the process.)

Products/Services

Product Development

Capabilities (skills)

Marketplace

**Overview
Summary**

(Understanding who you
are)

**Management
(make up/stability)**

Facilities & Equipment

Continuity

**Strategic Plans
(where do you expect
to be?)**

**Financial Stability (last
3 years and projected)**
Sales, operating income,
net income, working
capital ratio, etc.

Aggressiveness

**Status of
Technological needs**

**Sales Make-up,
changes and
projected**

Sales, changes and trends
(past 3 years and projected and why)

- Labour components**
- Changes and why
 - Productivity
 - Efficiency
 - Training
 - performance

Ranking of the Products/Services to the Competition

Preventive Maintenance

- Materials**
- Selection
 - Waste, etc.

- Components**
- In house
 - Subcontracted
 - outsourced

Technology Plan
(an implementation of change)

- Quality**
- Understanding
 - documentation
 - rework.

Product Volume

- Delivery
- Waste
- Rework

Utilization

Product Complexity

- Standards**
- Specifications
 - Quality issues.

Implementation of a Technology Plan

- Managing
- Directing
- Monitoring
- Assessing results
- method

Change in how management addresses the potentials and the future

Technology changes required at the current stage of growth

Goals
Fit of the new
Processes
Scope
Measured progress
Strategy

- Document background and starting position
- Define the range of involvement
- Components to be assembled and their dependence, interdependence, and independence
- Analysis tools for acceptable, repeatable and reproducible results
- Stages in the Plan for evaluation and commitment for acceptance, rejection and/or modification
- Timetable
- Decision traceability
- Commitment of resources

Concurrent evaluation and learning from past decisions, impact and why it was required

Management focus

(without limitation)

- what to consider
- how to make it happen
- direct resources and interactions
- review at stages of progress
- financial impact
 - capital costs
 - market responsiveness
 - technical potential
 - difficulty
- data collection
- assessment
- interaction evaluation (others)
- advancement
- documentation and updating
- specification details
- refining and adjusting

Implementation requirements, durations and progression

- Review, reconsider and reflect for the *best choices* for the financial ability of the firm

Timetable

Management

- Responsibility
- delegation

Staff Capability

- Changes I the last 3 years
- Plans
- New requirements
- Equipment advances

Human Resources

Staff turnover

- Why and
- Why not

Training

- to what extent
- how often
- what focus or directions
- upgrading
- who
- why

Where is the need from

Product

Scope

Reassessment

**Product
Development**
(New Product Development)

Life Cycle

**Evaluation stages and
review**

Value

Team Contribution

Compatibility

Assessment Stages

- Motive for Development**
- Cost improvement
 - Line extension
 - Tired development
 - Old ides or new ideas

Market identify

- Needs
- Wants
- customers
 - types
- segmentation
- scope of system
 - supplier
 - customer
 - competitor
 - methods

Integration

- control
- collaboration with R&D, mfg., admin., purchasing, shipping, etc.
- new product development process
 - organization

Marketing

Foresight

(future opportunities not readily defined now)

- future needs now
- create the want
- satisfy

Information

- research
 - studies, references, competition, distribution
- segment identity
- analysis of methods

Strategy

- Contingency planning
- Existing program

Operations

- Communications
- Resource allocation
- Reaction time

Make-up of team

- Varying authorities
- Responsibility

Action ability

- feelings
- group think
- status quo
- openmindedness

Identified goal (mission)

- one line wants
- collective challenge
assess its
appropriateness
- measurement of
success

**Team
Component to
Quality
Enhancement**

Critical Success Factors

- fit (need, want, must)
- where it gets the
company
- consensus
- shared vision

Product/Service
Understanding

Brainstorming

- key word
- all contribute
- anything goes
- facilitator – list
- mission match

Process Quality Management

- Neutral outsider

Strategic Planning → Strategic Thinking

applicable to technology, marketing, business, R&D,
production processes, human resources

“Out of the Box” thinking

Recognition that there is a box!

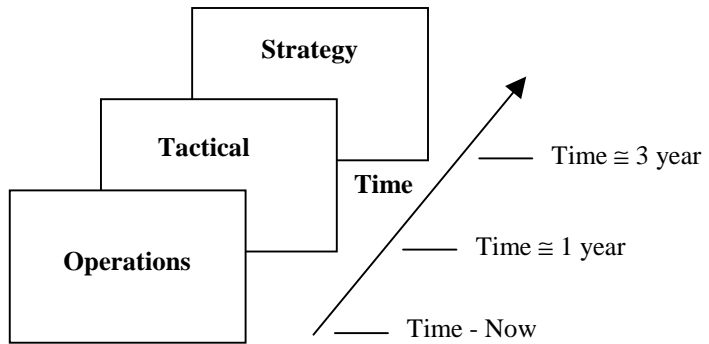
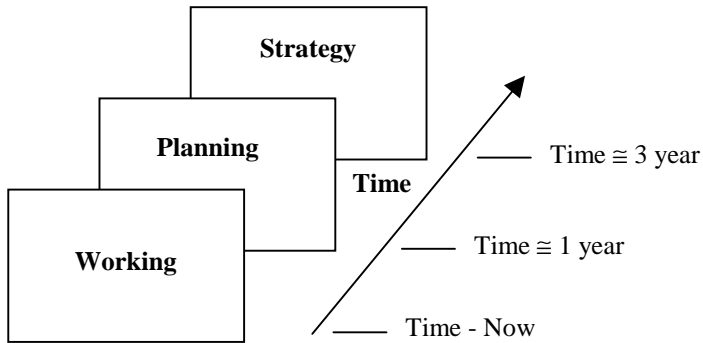
How do you value intangible assets?

- 1) Relative value - progress
- 2) Balanced scorecard - supplement financial measurement with customers, internal business processes, and learning/growth
- 3) Competency models - successful employees and calculating a market value for their output
- 4) Subsystem performance - quantify success or progress in one IC component
- 5) Benchmarking
- 6) Business worth - ? If present info disappeared; ? If doubled amount of key info; ? Value of info change. Cost of missed opportunities, etc.?
- 7) Business process auditing
- 8) “Knowledge Bank” salaries as a asset for future cash flows
- 9) Brand equity valuation
- 10) “Calculated intangible value” compared ROA with industry

**Intellectual Assets -
Intangible Assets**

What are they?

(measurement, evaluation, performance,
compensation)



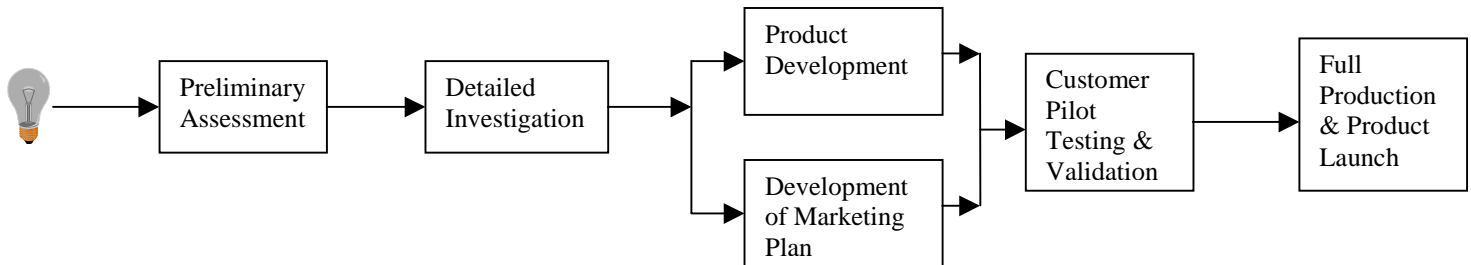
Appendix B

Product Development / New Product Development Considerations

$P_s = q_T * q_F * q_M$ (John Preston, Former Director of Technology Licensing, MIT)

The probability of success of any project is a function of the quality of the Technology times the quality of the Funds employed times the quality of the Management (including marketing). Product development is one of the components within this equation.

This is leading into some observations for a strategy for your new product development and a structure that will provide rigor to reduce or eliminate those ideas that really don't fit. You may recall some of Robert Cooper's (McMaster University) material on Stage Gate and Game Plan activities for new products. Well I will use some of that perspective here. You will need to customize it to reflect the company's perspective and issues.



This has steps or stages noted above that need to be further adapted to suit your particular scenario. However, each of these aspects has a title or gate with a stated objective pertinent to the company and a method to score or rank the criteria such as Yes/No for those that must exist and a numerical figure (1 – 10) for those that should exist. This is repeated as appropriate for each level with a designated person for the ultimate decision at each of these points.

Some other thoughts about these components follows:

Product Development Strategy has to dovetail with the overall business strategy for the family of products and growth of the transformational where-with-all that is consistent with the market opportunities.

The Guide for your product development should include stages (more or less than above) in which clear objectives are identified, a method for evaluation (hard and soft) and a control decision (who's responsible).

The process starts with generating ideas, recording and reviewing the prospect, recognizing the idea sources (a source for other ideas).

The screening criteria need to be established and able to be adapted as you learn from the experience.

The initial evaluation has to establish conditions that must be met to meet the company's requirements. These will require you to spend some time deciding on what is right for this company and where it wants to be. This is a Yes/No; go no-go decision point. It is a lot easier to stop a bad project at this point than when there has been effort and funds committed. If this is positive then further issues have to be considered before going any further. This can include things such as: 1) Fit for the company (product area, market, limitations, technology required and scope and manufacturing/process boundaries)

2) Feasibility (is it technically feasible, resources available, is there a market for the product and can it be reached, sales/service/distribution resources etc.)

3) Other (what is the potential market available, what are the expected sales of product and is there a product champion)?

If there is not a resounding yes to these types of issues why would it proceed.

If the idea passes this screen then the next one looks at things that should be met and hence you may want to apply a value to the score and then rank how high the overall score is as an indication of the order of support it should receive. Again these have to be individualized for the company but issues like product advantage, market attractiveness, fit with the company and company specific items (why this is an advantage for the firm) need to be recognized.

After you have gone through this then you can start to commit more significantly to the next stages in the chart above.

The above deals with each new product development idea but these all have to fit into the overall strategy for the firm and where it is headed. So there will need to be something that maintains the direction of the various individual initiatives and their contribution to the overall product direction and integration.

Appendix C

Summary of Case Examples

Cases

Case for People and Product
Development

Case for Making Change Work
(Quality and Productivity Issues)

IT & Mfg examples for Strategy (2)

Business Life Cycle, Bell Curve –
Business Design

Case for People and Product Development

The following is a true case of a firm with a number of things happening concurrently and over an extended period of time. There are questions of what could be done and what might management identify as tools to help overcome some of the needs.

The owner's father started the business. It was a modest operation producing for the Maritime market and later the Atlantic Region. Over a number of years the business grew and expanded. Sales were easy in the busy years. Expansion was the norm for everyone.

The owner's sons came into the business but they were not interested in participating in the firm other than for a job. They worked out in the shop. To provide more control in the operations a bookkeeper was hired to do that type of paper work and prepare a monthly statement.

The business wanted to have less dependence on some suppliers and have some of its own unique products. A new product was fabricated on the shop floor. The design continued to be modified with each new order as they tried to overcome the fabrication and assembly problems that persisted. This was starting to take more time than expected for this supposedly easy diversification. The production equipment continued to be modified. It robbed the owner of the time he needed for other business needs. However, whatever had to be done to get the order finished became the challenge, regardless of the cost. "Just get it done and we will fix it up later."

While the above was going on, a falling out with the salesman occurred because who really made the various sales. When a buyer came to the plant and placed the order, should the salesman get the credit? "Besides who needs that salesman, everyone knows us, we have been around so long we don't need that." The owner felt he could do all that was needed over the phone.

Over the next three years, the business fortunes suffered. In analyzing the events the following things surfaced quickly:

- Costs are out of control - labour costs, material costs had all risen with an inflation factor applied to the selling price of the products.
- Cost analysis was aggravated by the lack of a cost understanding and monthly statements were useless. The Statements used a category called Unused Labour that was plus or minus to make it all balance.
- In looking at the financial statements prepared independently, some parts of the operation could be isolated. One particular section, , was allowed to do its own thing. The supervisor running it had been there for years and was supposedly good at the job he did. However, purchasing was done separately from the office. Invoicing was what he turned in. Over the three years that part of the operation lost from \$7,000 to \$21,000 in direct labour and material costs alone. No changes were considered.
- The problems associated with diversifying with their own designed product were never resolved. Repeated attempts never dealt with resolving the basic issues.

- Planning was hit and miss. Coming to grips with the issues did not occur. Change in management attitudes did not surface.
- At the end of the three years in question the company was having decisions imposed on it by its banker. These still did not deal with the company's concerns but the bank's interest for securing its advances. Earnings in that period fell from \$80,000 after taxes to a \$500 cash loss. Now, without the earnings to make necessary changes and the pressure from others to reduce the advances things were tight.
- Sales were now reviewed. Volume was still at \$1,700,000 as in the previous three years. It was great to keep the sales up there, but what did that sales volume really mean? In looking at its significance, the number of units produced was dropping. Walking around the shop had not detected the fewer numbers. Remember, labour costs had risen one year so the selling price was arbitrarily raised an amount. The next year, material costs rose and the selling price was again increased. But the same staff was not putting out as much product.
- Finally the first step in change occurred, a time clock to try to find out where people were spending their time was installed.
- There was a further three years of struggling to recover some of the profitability it had before. Some other changes happened but the problems with the company designed product line still hadn't been resolved, it was kind of a "best fix for it that we can do" approach.
- Other competition entered the market, partly because this company was forgotten because no one out there marketing/selling for it and the other firms were at the customers' door. Besides being available, the competition was offering improvements for their products and making design changes overshadowing this company's product. The competition was coming out with a better product.
- A solution sought by the owner to the company's change of fortune was to now expand and diversify into more products.

The day to day operational pressures present in this case are experienced by many other firms. Hopefully, in not as dramatic a fashion.

Thinking of the people and product development issues from your experience, what kind of things should the company have considered?

Technology developments and new technologies can mean new attitudes. Identifying and coming to terms with the issues.

Case for Making Change Work (Quality and Productivity Issues)

This is again a true example. A firm in New Brunswick was buying raw material from two firms in Nova Scotia. Both of these suppliers were very experienced and capable firms. They produced good product but there was a preferred supplier. If there has been a third supplier then the mix would have been different again.

A quote comes to mind here

“... all manufacturers want a second source. The problem is, they don't necessarily want to do much business with that source.”

(HBR, J-A'95, page 62)

Company A made a good product. Its consistency however, ranged from 70% to 98%. Every time the customer bought from A, they had to modify their production.

Company B also made a good product. Its consistency was always at 80%. When the customer bought from B, there was no extra effort or concern.

Both firms sold their products on the same basis, the analysis of a particular component in the raw material. So they were competitive on cost.

The customer was curious why these two competitors had such different product consistency when their raw material was the same, suggesting a difference in process possibly.

The customer asked each for the specifications on their product. Company A offered to supply the standard information that consisted of a few lines and asked “Tell us what you want and we will supply it”. Company B provided a 12 page detailed outline of what made up its product. Both companies were unaware that there was any other way of answering the question than the way they did.

Company B continued to be more favoured for business by the customer because they presented themselves in a completely different manner.

The consistency question suggests that the productivity and product knowledge approach are quite different. Quality has to be concerned with what is right for the firm and is right for the customer. Company B may be able to take advantage of its quality practices as a marketing tool if it was aware of it.

IT and Manufacturing Examples (Similarities)

The following develops scenarios for a couple of case studies relative to Technology Planning from different sectors. There are common generic issues requiring Strategic Business Planning and in particular a perspective on technical and technological changes within the context of the complete company.

Company 1

A small, modest IT firm in the multimedia sector has been working hard to develop its knowledge and skill base and has been able to establish a credibility in its strengths and speciality. One of the goals has been to capture some significant contracts. This is going to have the firm flat out busy for up to the next year.

As the company has accomplished this milestone and launched other concurrent initiatives the question arises for the management. "Where do you have to be in 1, 2, 3 years from now in the type of business that will be required to be performed then and what will be the effect of technology changes that you can foresee now? How are you going to manage that transition? What is the action plan to connect the dots and close the GAP to accomplish the direction that is required?" It is inappropriate to expect that a rifle shot from such a distance will have the appropriate accuracy. However, if trends are considered (and the market predictions and influences) a plan can be established to map a path to where you need to be.

In this sector reference is often made to the fact that it is a rapidly evolving industry. Every six months can see another generation or evolution happening in it. If you have the above situation of now being successful with contracts and you have not been examining the future by the time you are ready to move onto other contracts you could be two or more generations behind. How do you leap that GAP which could have become a crevasse or a canyon? It is also one thing to rationalize a plan to accomplish the jump but without the tools (resources and qualified staff) to make it happen are the projections realistic? The plan requires time to establish and implement with an affordability consideration incorporated into it. That latter issue of funds to finance it can delay, curtail or inhibit the potential. So from the start the company has needed to examine earnings, capitalization and an investment perspective. Investment is used in a broad context here.

A complication is the fact that the staff is fully committed by the contracts but need to upgrade their skills to meet the future product or service requirements. This is necessary to provide continuity and to assure employability, otherwise new staff will have to be trained or hired to perform the new tasks as the company evolves. Where will the time be found for this continuous learning? It is important and has to be planned for and made available.

There are other issues but the point with the above is that if the above is treated as a project it may be considered only briefly to launch something. Unfortunately, there will

not be sufficient the thought and evaluation process to establish the longer-term strategy that also requires assessment, implementation and review.

The dilemma for management, especially for young entrepreneurs but not limited to them, is “What are you going to do about it?” An attitude and in a sense a culture has to exist that these issues are deemed to have merit, are of value and time made available to consider.

The same type of scenario exists in other sectors

Company 2

This small manufacturing company has been struggling to obtain contracts to sustain itself. Recently they have been able to wrestle a significant contract, from a mature and seasoned competitor. They are very focused on customer service, providing quality products, exceeding requirements and being a very close knit management team. Potential for volume growth is forecast to be achievable and will be a means for the company to up-grade its equipment and enhance its processes, tolerances and quality. Great expectations are anticipated. This will be the launch pad for growth. What kind of commitment will be predicated on this being a sustainable contract and that the customer is capable of meeting its commitments. How sustainable will the volume of units be and remain?

It is really great to see a hard working team obtain success in this manner. Now, not to be negative but have they examined why or how they were successful with this contract or is it just assumed “We are really good!” What are the potential reasons and do they pose a threat to the business?

What could they learn in probing their customer for how they could be of more help and hence building an intimate relationship. What could they determine in assessing the competitor’s position? Will that competitor be seeking to recover the customer and continue to challenge the firm? If not, why not? Is the customer interested in having a second supplier? How much business do they want to do with a second supplier?

It requires the firm to collect the information and finesse an interpretation of its meaning. Below is a scenario that is possible.

The customer may be looking at increasing sales volume to a point where it can get into its own manufacturing. So the contracting out may be short-term or if out-sourcing is competitive with internal production then there may be room to continue as is.

The former supplier may be aware of the customer’s desire for their own production and is willing to move onto other opportunities that are going to be longer-term rather than fight to keep a customer they deem they will lose anyway. Are they cutting their losses in time and effort to respond to new prospects and be a leader rather than a follower? The supplier may have chosen to let it go. There may have been other extenuating circumstances that they assessed that had them choose not to pursue the client.

What was the most likely reason for the market penetration? If this is not considered, then they could be vulnerable to making wrong or weak decisions that can substantially jeopardize their business. If they are focused on the project goal of capturing a contract they may not have balanced the strategy of the move or how their business plan could be hampered or helped.

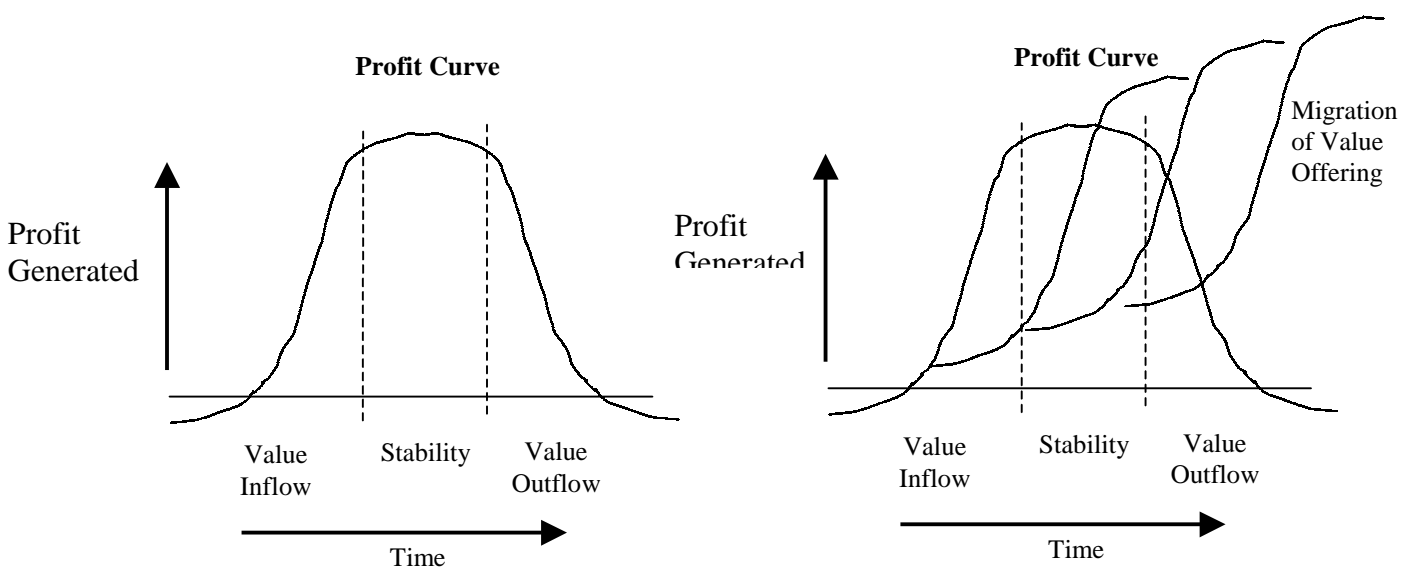
Both companies have similar generic issues. How are they going to plan for the successful evolution and growth of their businesses in which earnings will support the business needs and the development of tangible and intangible assets. The latter assets, including skills, structure, process, innovation, to name a few are a lot harder to quantify for the investment in time, management and results. There is no generic solution, each has to be examined in detail for what fits the current situation, can be accomplished and will be implemented.

What does management need to do continuously? They need to be aware of the holistic issues for the company and be strategizing. That is not meaning that this is an all consuming activity but with a focused and a thought out plan it can be managed within time frames that maintain the heading and communications to all who have been delegated responsibilities. It will become evident, those that don't want to participate and choices need to be made to deal with that as well. The biggest difficulty is the transition from when the firm had only one individual performing all those activities to others being involved. Affording to have others work for the owner and being given responsibilities as well as trust is another hurdle left for another case.

Business Life Cycle, Bell Curve – Business Design

In reading the book “Value Migration” there were some thoughts that came to mind relative to a modest manufacturing company and the stage it is in in its business cycle. There are analogies drawn with product life cycles. There are 3 main aspects identified of a business’s life: value inflow, stable period and value outflow. This is reflected as being similar to a bell curve. The unfortunate part for a number of companies that are in the flat top part of the curve or on the slide down the backside is that they are unaware of their position in the cycle. There can still be a lot of activity in the business but the long-term prospects are diminishing.

The company has had the strong inflow with business having started about five years ago and in the last two years had volume and production blossom to a level that has now placed new challenges on the company and its management. The growth itself started to flatten out in the last year with it now recognized that the volume is going to be flat for the next year or perhaps two. What will fill the gap or meet the needs of customers is uncertain. New customers are being sought as the old ones are being lost due to the lack of new designs or ideas to meet their requirements for fresh goods. The company seems quite prepared to enjoy the breather and have accepted that the sales level is fine and the margins are comfortable. The problem is they are in a false sense of being successful. There are many issues with in the company that have not been dealt with and will only continue to grow in severity as the issues are not confronted and resolved. There is a lack of urgency because they feel they have lots of time available to them. The company is considered to be in the outflow stage and while it can continue for a period there are signs that things are changing and could be approaching a rapid transition. There are markets that have been difficult to penetrate and if not established soon then they will likely be abandoned. But an even bigger concern is the potential for a new competitor to present itself and fragment the market.



Appendix D

Partial company summaries of issues raised
during Strategic Technology Planning sessions

Comment for the next page:

From discussions, the categories were identified with the principals. The following challenged a company to view a number of components of its business make-up and then across each of the business components. As they filled in their comments they were further questioned to focus on issues and specifics to ensure these were not glossed over for consideration.

Company A: There seems to be four group type activities needing to identify a strategy:

GAP identification & layer what technical changes can accomplish and accelerate				
Relative significance for business now and Projected volume-2 years				
Is the growth above realistic? How much is considered in-hand now? What are the stumbling blocks?	What will you do to extend the life cycle &/or upgrade. What will be the pressing issues for evolution here?		I question whether n/a is valid for the life cycle of the current skills and the need to upgrade to offer speed, detail sophistication, etc.	Is this flat growth but because of \$ volume it is appearing to be much less? How does it connect with the % change increase with the product & production numbers below?
Life cycle of key product				
How it strengthens or supports corporate objectives				
Other than the relative degree explain why and how these groups are contributing to the opportunity for the firm				If this is so low in its relative merits, why is it receiving resources?
Mrkt intelligence & trends				
	What can be done to get better intelligence? Who needs to do it? Have you identified what you want to explore and seek?			
Revenue projections, margin prospects & industry norms	\$ or % Margins/Ratios Ind Margins/ratios	What do you want & need for each of these groups?	There will be a rationale for acceptable differences between each	
Market migration, technology influence	What and where is the direction going for each of these? What can knock you out or must have to remain in? If it is technology driven what has to be included in anticipation and to give the agility to dance the dance you are going to have to do. How fast is it changing, are there plateaus and barriers you need to recognize now?			
Partnerships, Alliances and Collaborations: type, schedule & potential The questions (right) are for each group	Who Type When Likelihood Offer/give up Complement - other services			

Complexity, components – in-house - subcontracted - outsourced				
I guess I had looked at this being a recognition of what you can do well and what is better done with or through others. Are you trying to have everything and is that going to be cost effective or does it need to be stagewise introduced and what is the time frame / cost factor?	I think you are looking narrowly at this as having no other involvement because of the IRAP support. I am not considering that, the question is the on-going activities within each group, the complexity, product excellence and value provided.			
Financial limitations & alternatives →				
Explain →				
Contingency →				
Product and Production criteria now and Projected				
Sorry I have had to go back to my notes to recall what was on my mind with the above.	What is the direction of the content and the potential for proprietary content and its impact on your products and production techniques and the subsequent changes to these? What will be the future platforms, criteria, identity, shared product support The box is intended to identify the extent of the GAP between now and where it is going and when within the context applicable to the company. This further links to the financial and contingency aspects. Further what is required to close the GAP or at least maintain pace? This also links to staff, skills, and time frames.			
Product cycle, Migration strategy, application reuse				
Questions about product and production are intertwined with cycle etc.	How is each group going to change, that you can foresee. How do you want to affect and effect their change? As you predict where things are going and your intelligence gathering supports it, how do you propose to cause the changes within the company in the manner you want to realize? What can you reuse and lever to further advantage because of the method you contrived to build it that would offer extended applications?			
Process Simplification likelihood, extension process & product				
Explain how the above are going to be achieved for each group, does it make sense and could there be synergy				

common to all groups				
Product compliance				
What will determine that you have met the required conditions of the product at the various steps leading up to the finished product. Longer term projects need a time line and milestones for evaluation.				
Inventory of existing hardware and software				
The above and below are a little like where are you coming from and where are you going and also how fast do you have to get there? These are tools along the way similar to the staff skills and their timeliness.				
Projection of HW/SW, schedule for intro'n & \$\$				
Human Resources existing				
Human Resources projected (realigned)				
		How do you propose the manage this staff fluctuation and the development that is required to ramp them up to effective operations?		
Skills migration, training / retraining needs/\$, compatibility				
I want to challenge you again with the mobility and versatility that you may need to have with your staff and consider whether each of these groups is going to be placed in silos and unable to transfer or swap?	Your response above may have considered this question from a different perspective. Can you move staff up to more demanding functions, if not is the initial training so demanding that people are hired for specific tasks? If this is the case then are you limited and bound by what is available?			
Critical Success Factors Intangible indices Are these really things that you will be able to measure and contribute to determining how well you have improved and/or progressed? What are the items that will identify performance?				

Comment for the next page:

This company needed to spend some time putting a context on when and what type of sequence was required for some of its key business migration strategy. The summary was to also see the potential workload for a small team (3).

Company B:

Differentiate products - product specification and complexity - cost/margin - product life cycle - product mix - product contribution - product development - cost to develop - time required - required by the market - market analysis - degree of difficulty									
GAP - opportunities - expectations									
Market insight									
Production issues - ramp up									
Project management									
Customer assessment - location - % of sales - sales, type and repeat orders per year - contribution to earnings									
Staff - training -									
Shipping - absorbed/charged - rationale - options, different methods, quantity									
Key management GAPs - CFO - HR - Production manager									
Company Structure									

Comment for the next page:

This company sought product enhancement, diversity, real new design and innovation which would change the character of the business and its customer base. Sophistication in manufacturing and design would hide the nature of the value presented in the products delivered. This would require greater education of the customer of the benefits and performance. Simplicity and ease of application was also perceived to be superior features to reduce intimidation by the end users.

Management demands						
Senior management assets, requirements, delegation, key reporting,						
Additional management requirements [grow or buy] (financial, marketing, mfg, quality, software development, application specific, optimization, production)						
Inventory of skills now and projected						
Skills to be grown Skills to be acquired Skills to be contracted Skills to be partnered Connectivity of skills						
Customer awareness, interaction, transparency, innovation, value and solution resource						
Customer preference, customer migration, customer/user interaction, user intimate with customer co-managed (dealer/mfg.)						
New Product and service identification and opportunity evaluation						

Comment for the next page:

The company developed the categories from a brainstorming and notes on the wall. Then from each of these it sought to establish an understanding of what they meant and what was to be achieved. Then the timeline tool identified a practical means to implement the activities.

This was to address an existing maturing product, seek a migration path to another product/service offering with the same platform but different output and customer. A new revenue stream is to complement and blend with established processes. This particular plan spans a two year period and include new investment, markets, staff, skills and speed.

Appendix E

Strategic Questions to consider during the Technology Planning process

Technology Planning

Strategic Issues to consider:

What will make the company earnings in the future and will it be sufficient to sustain and grow the business?
What are the trends known now for the direction that the sector is likely to experience?

What are the processes that have to be considered to make the above possible? In what manner is the information and the methods to be employed going to have to be provided and made available to make the business decisions then?

What type of flexibility and agility is going to be required to cope with customer demands and competitive pressures?

What do you foresee as the changes that are going to have to start now and require time (investment) to enable it to happen?

All of these questions transcend the full scope of the business in varying degrees. What impact will technology change and its management contribute to the above?

Final Comments

The challenge for small and medium size enterprises is to succeed and succeed well while being a dynamic, opportunistic, courageous, customer focused provider of solutions that exceed the traditional or incremental norms and still keep the wolves at bay.

When the rules no longer work for the company, rather than trying to conform to the limits, the business needs to change the rules, change the paradigm and strike a new model for business success.

Unfortunately for many businesses they are too busy to realize that there has been a change and that a commitment to resolving the dilemma is required. Again the biggest difficulty is finding the time to consider the choices and issues confronting a business so an actionable plan can be considered and implemented for a course correction when things are still in an early stage and flexible.

There are some tools that can be applied to aid in the thinking and planning process. The speed at which these are applied is subject to the management commitment and the sense of urgency that exists in the team. Depending on the size of the business the team can be from one to many. However, the consideration of a team also suggests that there is delegation of responsibilities that requires trust, communication, understanding, clear vision and peer support.

Components for the process include:

- Discuss the business first and then document
- Set a direction/heading, not a fixed target
- A holistic view of all aspects of the business
- A path to explore the scope, address the significant strategic issues, plan to play the business game as a chess master
- Develop a process
- Establish a rationale
- Get commitment
- Be sure there is a champion
- Review the plan, adapt and revisit it
- Adjust for new conditions, prepare for lateral moves
- Review assumptions and flank pitfalls
- Make sure it has business sense and is affordable
- Seek to make the probability for success equal to 1
- Identify key success factors, indicators of results

Outcomes

- Clear direction
- Rationale for focus
- Actionable plan
- Implementation is immediate
- Commitment has been established by the process

Manage technology change, develop understanding, communicate

Seek more than the traditional or incremental improvement in business (avoid the linear business model of sell more and the business will grow, that may not be enough to survive). The requirement is for significant success, by striving for that your chances increase and improve.