The following is a highlighted summary of the book, The Soul of the Enterprise, *by Robert Hall.. The statements below are key points of the book as determined by James Altfeld and have been made available at no charge to the user.*

The Soul of the Enterprise
Robert Hall

Chapter 1: Catching a New Wave

"a New form of business must be more open than it is today"

"the public simply requires more disclosure. For example, they want to know the ingredients of a can of food even when the terms are poorly understood. They want to see data indicating the reliability or history of similar products. They want to know what is being dumped in the ground, air, and water."

"working to the standards of world-class quality requires employees to take a great deal of responsibility and work closely together… word class performance begins w/ world-class trust. Trust begins when the in-house secrets are extremely limited and managers stop being bottlenecks of information flow."

"when suppliers and customers are truly partners, they want to know a great deal about products, services, and operations."

"the definition of a competitor needs refinement. A competitor is not an enemy. A competitor simply offers an alternative to the same customer using a different set of players in a full birth-to-death cycle material use, and using a different improvement process."

_ *In Search of a New Soul*

"jockeying for growth and profit, challenging as it may be, is no longer sufficient. The soul of the new wave is growth in the quality of life."

"the soul of an enterprise is a shared feeling that its objectives are worth sacrifice by those who work in it and by the society it serves"

"when the railroads of the US stopped expanding and coasted along as a service business, they eventually began to decline. The system did not know how to create excellence without promises of growth. That defect in the system must be overcome."

"perhaps it could be called the spirit of inquiry, a continuous quest to somehow make things better… a spirit of inquiry is a lifelong interest in learning how to do something new."

"but a spirit of inquiry is only part of the general motivation to improve the quality of life"

"each enterprise is a network of people; its soul is the tie that binds them together"

Chapter 2: Beyond the Acronyms- The Three-Day Car

_ *The Soul of the Enterprise*

"from the European viewpoint, the soul of the Renaissance was growth through intellectual enlightenment. The soul of the age of exploration (or colonization) was geographic expansion, and the soul of the Industrial Revolution was growth through technical process…the soul of the information wave is growth in the quality of life"

"the soul of enterprise is the unifying commitment of its collaborators to customer service, excellence in operations, and an allegiance to a common process of improvement."

"one can divide the soul of enterprise into three kinds of motivation"

Soul of the Past	Reputation. Tradition. Heritage. Pride. Brand Allegiance. Goodwill.
Soul of the Present	Commitment. Obligation. Concern. Responsibility to customers, internal and external, and to other stakeholders in the enterprise.
Soul of the Future	A motivating vision of what could be, including laurels for accomplishment and specters of doom.

_ *Open-System Enterprise*

"open-system enterprise is analogous to open computing systems in three respects. 1st, people may enter, make contributions, and leave… 2nd, open information is the rule and not the exception. Anyone can gain access to basic operating information, including competitors… 3rd, is a pursuit of facts, and a predisposition to base our actions on them."

"the phrase 'taking ownership' is commonly used to mean taking responsibility"

"the economics 101 theory of the firm- holds that owners are entitled to run a business in their self-interest because their money is at risk."

_ *Where are we Going?*

The major features saturating future scenarios are:

"Distributed, interactive organizations: a radically different form of business organization with much smaller operating units, each focused on its own process but linked by communications. Much more decentralization of responsibility"

"Dominance of the need to develop people- not only as 'workers' but as customers"

"Guidance by visions, especially during periods of tough transition"

_ *The Challenge of Twenty-First-Century Visions*

"a vision can never be a precise forecast… it can however, provide a rough guideline to future development. If consistently evoked for guidance, visions become drivers of major change."

"well done, a vision represents a multiple set of goals"

Chapter 3: Quality Growth

"a dictionary definition of quality will not help anyone comprehend the bafflegab now used by quality aficionados."

"Ralph Stayer of Johnsonville Foods, refuses to use the term 'quality' inside the company. Instead, the term 'performance' used with modifiers communicates very similar ideas."

_ *Information-Wave Improvement Processes*

"whatever Deming's creative intentions were, his definition of management as predicting and controlling any kind of process is an information-wave concept. It shifts the primary focus of organizations from results to processes. Status shifts from possessors of assets to the improvers of processes."

_ *Redefining Quality*

"back when quality was considered only the function of a quality department, defining it was easier: conformance to specification. Anything that passed inspection was acceptable- until it failed in use. A quality department mostly performed police work"

"defining quality as customer satisfaction sounds as if it relaxes standards. Instead, it shifts responsibility to each point of action, so everyone must think about what a customer wants. Processes for setting specifications themselves must be 'right'. Just passing inspection is good enough."

"improvement thinking concentrates first on what is necessary to satisfy the customer, then on simplifying total processes, elimination costly errors and defects whoever possible, and concentrating investment in areas where it counts. Performance that seemed impossible by specify-and-inspect systems start to become routine, but it expands the responsibility of everyone in every position, including the customers. (A responsible customer assist with their suppliers improvement processes)."

Four major categories of quality:

1. *Indifferent Quality*. Garnish on the plates for a junior high school football banquet is probably not a high priority to the customers.
2. *Expected Quality*. Cleanliness of a hotel room are simply expected…'must-be' quality. Safety features, such as a reliable car brakes, are an extreme form of it.
3. *One-Dimensional Quality*. Features that customers like if they are present and miss if they are absent. Friendliness of waiters and delivery persons is often in this category.
4. *Unexpected quality, or exciting Quality*. Pleasant surprises ; detailed maintenance history of a used car.

_ *Different Kinds of Customers and Suppliers*

"refining how customers are classified is very helpful in tracing the total processes associated with products or services. Considering secondary customers or suppliers can help identify environmental issues, among other things. For instance, a transmission mechanic is an important secondary customer of a transmission fluid that may have heavy metals in it (as ell as understand how to service the beast)?

"not all customers and suppliers are equality important to a given process. Classifying customers and suppliers in a given service process is a starting point in sorting out who should be improvement collaborators or who should be our partners in an open-enterprise arrangement."

Different Types of Customers and Suppliers

	Types of Customers		Types of Suppliers
External	Final recipient or user of Product service	*External*	Provider of product service
Internal	Next person in the ongoing Chain of operations, or Next stage of process	*Internal*	Preceding person in the chain of operations, or the preceding stage of the process
Primary	Firsthand users experiencing The product or service	*Primary*	Persons performing the operations that directly provide the product or service
Secondary	Agents, dealers, service Persons, sales clerks, etc. In the large sense, even Includes the general public Environmentally affected by By the product or service.	*Secondary*	Second-tier and indirect suppliers

_ *The Evolution of Quality Performance Measurement*

"until the Japanese instituted the Deming Prize in 1951, almost all quality prizes were for results, not process. The fastest horse won the race, and a jar of pickles judged tastiest was tagged with a blue ribbon. The checklist for Deming Prize considers results but emphasizes quality practices and procedures. A winner that continues to improve its processes to serve the customer should be better in the future than it was at the time it received the award, which so far seems to have been reasonable assumption"

"the criteria of the Baldridge Award give more weight to customer satisfaction, but the examination still concentrates on processes. A winner is selected not because its products won a blue ribbon but because its processes to satisfy customers are considered to be excellent, with results evident"

_ *Ultimate Manufacturing Quality*

"the objective is to make quality of systems and products to non-issue to the customer. People can only perform with excellence consistently if the methods they use prevent them from making mistakes."

"the Japanese term is *poke-yoke*, which is coming into use worldwide"

"determining the cause of a quality problem is not the same as fixing it and certainly not the equivalent of making sure it won't happen again. Fail-safe methods are becoming more and more essential. For example, screws skipped or jammed are a major quality problem in automation. One level of correction is to equip an automatic screwdriver so that if a screw is missing or jammed, the machine stops and the correction is made. A second level is to fail-

safe the production of screws so that defectives never leave the suppliers factory. The 3rd level, and best is to eliminate screws in design, thus eliminating both the quality problem and all its associated expense."

"quality begins by defining the market niche and its customers' needs"

"quality of life suggests living to the fullest without great consumption of resources."

"the quest is for a high quality of life through a high-tech, lean-manufacturing use of the resources obtainable, sustaining a standard of living much better than living on collard greens and rainwater."

"having a good quality of life also implies having choices"

Chapter 4: Catching Up with the Times

_ *The Mysteries of JIT*

"one of the most insidious misunderstandings about JIT is that the objective is merely to reduce inventory on the company's books. The real objective is to remove the waste- and costs. Inventory is only one kind of waste, but it happens to be an indicator of long materials lead times, which in turn suggests that many other kinds of waste lurk in places far removed from shops and warehouses. The Japanese consultant Shigeo Shingo identified seven wastes, like the seven sins, from the waste of overproduction to the waste of defects, but he missed at least one, the waste of inefficiently creating and using information."

"many companies believe that JIT is merely having the supplier hold the inventory, either off-site or on consignment"

"cutting operating lead times improves the turnover ratios of many kinds of assets"

"it's hard to stop doing what you're doing long enough to figure out how to do something different"

1. time, rather than space, is the basis of 21st century organization
2. learning is a time-based concept
3. eliminating wasted information may eliminate the ultimate waste
4. decreasing lead-times-to change increases flexibility and responsiveness
5. decreasing routine lead times without adding resources signifies the elimination of waste

"power is control over resources or rewards"

"whenever a purchasing agent insists that every engineer contact him before calling a supplier, delays are "institutionalized."

"an organization chart describes power relationship based on positions in space. Higher or lower boxes show how people supposedly relate, but unless communication patterns cut across functions and levels, the organization is extremely bureaucratic and autocratic. However, everyone generally understands 'where they are' because it's easy to see."

"an organization chart is a symbol of timeless relationships that do not exist in fact. Henry Ford thought of his system as timeless assets, like land. His realm once established, he need not continue changing, but ever after his goal was to defend it from attack"

"after 1920 Henry organized and manipulated to stay in control, for further improvement. He delayed both the six-cylinder engine and the V-8"

"Regardless of any formal organizational structure, most of us must set priorities and allocate our time among a number of concurrent responsibilities. When we do, we think like members of time-based organizations. Organization charts clarify the 'power relationships' but seldom the communication linkages."

"the conclusions from all this (1) 'power' is fundamental to most any human organization or relationships, (2) establishing a time-based organization to greatly reduce delays and lead times cannot be done without rethinking power relationships; and (3) shifting to a time-based organization is not a restructuring. A spatial diagram will probably still show a few major power relationships, and those might be restructured. The rest is a process of developing people so that communication is unimpeded and responsibilities are understood with minimum delays for review, approval, or coordination"

_ *Why We Need Open-System Enterprise*

"maintaining trust between people is the number one factor in time-based organization. Trust is confidence in other people, confidence that they can and will do what they say… nudge almost anyone involved in lean manufacturing and they will say that building trust between people is the key"

_ *Different Senses of Time*

"fixation on profitability by investors does lead to bias to improve short-term cash flow. This bias leads to under-investing in the intangibles of long-term development and to excessive contentiousness between "stakeholders" who should work together. Concentration on near-term issues crowds out the development of long-term vision"

"time-based organization creates learning time for its members"

"without clear direction, such an organization is confusing. The "learning organization" seems to depend on several factors:

1. a strong set of expected behaviors through a working culture or code
2. unified visions or objectives- taking time to be sure that everyone is pointed in the same direction. (experience w/ hierarchical command leads executives to ignore this.)
3. a strong sense of responsibility. (this implies the need for a power system, not necessarily a person, to confer rewards and sanctions for performance.)
4. a common improvement process using universally understood language and logic *in practice* (knowing how to learn).
5. a consistent system of performance measurement.
6. regular planning and improvement cycles- learning cycles- to stimulate improvement

_ *Learning is a Time-Based Concept*

"stimulating open communication presumes that everyone will take responsibility and that they will readily learn and improve. That does not happen unless people know how to collectively learn."

"the 'real JIT' on the shop floor is learning fast by doing: size up"

"another objective is consistency of performance. The same result time after time is important for any production, but of particular value for items such as rubber parts for which consistent blends and time-temperature profiles give standard results."

"visitors to well-done JIT factories are usually amazed by the simplicity. An improvement cycle is a learning cycle. Organizations such as Toyota that practice regular improvement-process cycles do not necessarily show better performance cycle after cycle."

"organizations with regular improvement cycles are like athletes with regular training. They do not always win, but they have a greater chance of it."

"learning new habits presumes unlearning old ones. Maintaining an improvement process presumes building on old accomplishments."

"a saying at Honda is that one must 'break old habits; even the good habits'. That describes a culture of continuous improvement. The human side of it begins with acceptance of constant change and an understanding of where practice has been and where it is going."

"continuous improvement is continuous revolution."

_ *Information is the Ultimate Waste*

"In an information age, one objective is to avoid the generation of information waste as early in the process as possible. A second objective is to shorten all the feedback loops. That begins with products and process design. Therefore, a product designed with fewer parts of lesser complexity takes less information"

"A simple, compact production process requires less information to manage than a complex, widely scattered one."

"The moral: it may be the information age, but keeping operations simple will still pay off handsomely. Simplifying product designs as much as possible has a huge payoff."

"Information simplification is a major reason for decreasing the number of suppliers. Having a hundred suppliers in a hundred locations allows more communication in more detail with fewer people using a simpler system than managing a thousand suppliers in a thousand locations. The logistics are simpler. Interaction on product and process design is simpler. Solving quality problem is simpler. Transaction is simpler."

"The most verbally bludgeoned areas of information overkill are in accounting, materials transactions, and legal proceedings. In factories, the transaction load has been referred to as 'the hidden factory.' While the visible factory builds product, the hidden one builds

transactional information. In a complex, sprawling, big-batch factory, an elaborate control system is needed. Waste begets waste."

"Poor quality also generates information waste. First, quality errors are likely to have originated form an information error in product specification (or its interpretation) order transmittal, order entry, or elsewhere. Second, while accountants sometimes grouse bout the amount of information needed for quality documentation, it takes much less information to operate processes that are in control than those out of control or on the verge of it."

"The lesson is that one of the most important aspects of JIT is how to handle routine communication without delay- how to eliminate wasted information. Once a factory can respond to changes without a hiccup, it can easily best competitors who require huge amounts of information, checking and rechecking to do the same thing."

"visibility is unspoken and often unwritten *human* communication; it is important to a well-run shop or office. Visibility reduces the time and energy of human communication, including the time needed to correct misunderstood communication."

"improving visibility is one objective of JIT manufacturing. Many features of a JIT system create visibility in both offices and plants: work standards and instructions are located to be easily found. Key ones are often 'hung out to dry.' Schedules are prominently posted so *everyone* can plan ahead. A light signals if a machining process starts drift. Date stickers or lights tripped by use cycle counters remind us it's time for preventive maintenance."

"anyone who can directly see the next operation can easily serve it, especially if a set of visual cues is arranged for prompting."

"visibility enables a shop floor or an office to come as close as possible to managing itself."

"the crucial factor is that *anyone* can see the status of the shop floor at a glance, and the system should stay in control all by itself"

"operations laden with visibility cues are self-represented flowcharts that almost self-suggest how they may be further improved"

"to transfer megabytes of data, use computers. To transfer important cues and clues to people, use visibility systems and minimize clutter. Visibility systems grow where needed, like building sidewalks where paths are worm in the grass. In this way a visibility system is a non computerized communication system for a 'virtual company'."

"the superior organization will minimize the total information and human communication time needed to add value. Each of us has only a limited amount of time and limited perceptual capacity to communicate and process information. The key is continuously improving the visibility to humans of a computer-integrated system so that the system is also human integrated. That's what a visibility system accomplishes in a non-computer environment."

"as its heart, the Toyota system schedules and promotes learning cycles."

"improvement cycles, or learning cycles, are simply built into the expectations and the schedules of the company. Improvement is everyone's job from day one. The most basic improvement cycles correspond to the major monthly schedule changes… so schedules show quantities per day or per shift. They also state the time lapse between the need for each part if parts are used at the rate planned. That's an important idea called takt time."

"detailed planning and execution centers on takt time, the time allowed to make each part if production keeps up with part use."

"using takt time, experience operators can determine how to organize their work and lay out their areas for next month's production. Their complete work cycle, on average, must fit in to the time window allowed by takt time."

"if takt times increase (production slows), work must be reapportioned, and fewer workers are needed. They shift elsewhere. If takt times decrease (faster production), more workers must transfer from offices, maintenance, or elsewhere."

"the basic Toyota production system differs fundamentally from Taylorism because all experienced workers, aided by supervisors and staff if necessary, plan their own work… the workers have detailed current knowledge about their work area that is impossible to communicate or keep updated by staff personnel."

Speaking of Time

Lead time: Duration- the elapsed time from beginning to end of a process that may not be repeated, such as the lead time to construct a building. Lead time, once upon a year, before the fuzzing of 'cycle time' to also mean lead time, inferred only duration of a process

Through-put time: one kind of lead time, the time for material (or something else) to progress from one defined point to another in a process

Cycle time: the time between recurring events: time between completing units on an assembly lien, time between completing parts on a machine; or time between preplanning schedules. Cycle times with little variance, like machine cycle time, are clear in meaning. Cycle times with huge variance, like the times between the introductions of new products, lead to sloppy use of the phrase.

Cycle time- time between occurrences- may or may not be the same as the duration, or lead time, of the process generating the occurrences. In the absence of commonly understood terms, clear communication requires the use of time-line graphs.

Takt time: the time between completion of units or parts, determined by dividing the total work time available during a schedule period by the number of items needed.

Work cycle: the time between completing a repetitive operation on one part, or actually finishing any other repetitive speaking of time.

Planning cycle: time lapses between preplanning work. Some cycles are major and some are minor. All usually correspond to calendar divisions.

Learning cycles or Improvement cycles: everyone is familiar with the school examples: class hours, program modules, and semesters. However, very few companies prompt improvement processes in regular cycles as does Toyota. However, as every knows learning progress faster on a repeating cycle. Few people improve as quickly in the absence of a regular stimulus.

> "neither workers nor managers are anti-environment in sentiment, but their systems don't' encourage dealings with such problems."

> "economics seems to pressure us to defer a problem or get rid of it as expeditiously as possible-to take the easy way out. But if operations are guided by quality (prediction and control) and learning cycles, many issues are preventable. (why was material left unused so that someone stored it, unrecorded, in poorly marked containers to begin with? Maybe the "chlorinated whatever" was never actually needed at all!)."

Definitions of Material-Use Cycles

Material-use cycle: the complete flow diagram of material used by man, including natural processes as well as man-made ones. For example, a recycled aluminum drink can be describable starting at any point on the cycle. In simplified form: use to disposal container to aluminum furnace to rolling mill to can machine to filling machine to distribution to reuse.

Dirt-to-dirt cycle: a material-use cycle that begins with natural materials and ends with disposal in ground, air, or water. If a can made from virgin aluminum is sent to a landfill, it follows dirt-to-dirt cycle.

Reuse cycle: a material=use cycle in which material returns to its same application. The recycled can is one example of a reuse cycle.

Rebuilding: a product, such as an engine, that is restored to its original condition, or something near it. Some parts can be recovered; some must be replaced. The more parts that can be recovered, in general, the higher the efficiency of rebuild.

Remanufacturing: a product is restored to better-than-original condition, but without parts being reduced to raw materials. Its durability, reliability, economy, and features are usually improved; in addition, it may be more benign to the environment.

Recycling: a product or its parts are reduce to raw material and reformulated and refabricated.

> "as long as environmental protection is everyone's problem, it is no one's responsibility. The first step is for those who design and operate processes to take responsibility for environmental protection, and this comes atop other responsibilities for customer satisfaction and productivity now being assumed. That is, an enterprise working with its customers and suppliers is responsible for a complete cycle of material use."

> **"one of the major problems of managing closed-loop cycles of material use today is that a single organization is seldom responsible for the full cycle. The company that makes the container is not responsible for filling it, nor using it, nor for disposing of it. The cycle becomes a marketing or economics problem rather than a systemic problem."**

"the way to overcome this problem is by defining responsibilities for the cycle, that is, but making a specific chain of people responsible or a cycle of material use. Suppose the can company, the food company, were responsible for the disposal or reuse of the container. You make if; you find a place to dispose of it. Defining such responsibility would force al the self-interested parties to cooperate."

"environmental product design begins by eliminating environmentally troublesome materials. For instance, plated-metal parts are 'designed out' to eliminate the potential hazards of plating, or the metal is coated in other ways… the best way to handle hazardous waste is to have none."

"design for disassembly (DFD) promotes remanufacturing and recycling. A well-publicized DFD automobile is BMW's Z1 sportster. It use pop-on, pop-off fasteners and thermoplastic parts, which can be recycled, in place of thermosets, which cannot. By contrast, the low recycle value of Japanese auto design and low scrap-iron prices have recently driven Japanese 'car cannibalizers' out of business."

"having a large number of parts obviously adds time to both assembly and disassembly."

"one idea of the NCR Corporation's design engineering for instance, is 'no screws; no glue; no adjustments'."

"in addition, using a number of diverse materials creates problems, both in production and in … er… reproduction. The more materials used, the harder to take them apart, and the more work to sort them."

"modern tires are composites of different polymer compounds formulated for wear and performance in a given application."

"but composites designed to bind together for performance do not easily come apart for recycling. Much better to design items such as PC boards and tires for remanufacturing... do not sell a product. Sell a service."

"do not sell product. Sell a service *process* with products emb4dded in the service. In effect, lease products and charge for their use. Once customers sign on for service, they must return a product or module to get something else."

"the economics of this make no sense as long as materials, energy, and disposal are cheap if these are expensive, then enterprises that are superior at managing total dirt-to-dirt recycling processes with customers will be able to beat the costs of competitors using throwaway methods. The system should encourage maximum service competition with a minimum of Big Brother regulation."

"open-system information is essential for many environmental purposes. For example, chemical companies are increasingly reluctant to sell to customers who will not return containers or reveal how material is used. Knowingly selling hazardous materials is sloppy operations is a legal risk. If the company's drums are found in an uncontrolled dumb, they may willy-nilly bear the cost of cleanup. One of the easiest ways to avoid this is to require the return of the empty container before issuance of a full one. That happens to be very close

to the idea of a JIT kanban system. In addition, the seller provides a service by advising the customer on secure methods of handling and use and by assisting the customer to make those methods fail-safe."

"to operate this way both customers and supplier must know something about each other's operations. Secrecy is very limited. However, companies are starting to become much more interested in sharing information anyway."

"regulations are a contentious, minimalist approach."

"open-system regulations will help to materialize a new soul in enterprise. Make environmental improvement part of the competition between enterprises. Let companies advertise what percentage of their product is rebuilt or recycled."

"finally regulations do little encourage enterprises to push the state of the art- to discover the unknowns in their processes. The new soul of enterprises tries to anticipate and control problems. Regulations, almost by definition, awkwardly police phenomena that have already stirred protest."

"just-in-time production was born in poverty. Its original purpose was to minimize Toyota's waste of resources. Compacting operations into a small space avoided the need for new plants, for example, and short material-movement distances saved energy."

"during the oil shortage of 1973-74, Toyota's JIT practices included running equipment to make only what was needed, when needed, and shutting down idle machines whenever feasible."

"one of the simplest way to control hazardous materials is by another JIT idea- returnable containers. Instead of the user disposing of the material, the containers with any excess are return to the sender."

"preventive maintenance is another environment-friendly 'excellence' practice. It saves downtime, saves energy, and prevents emissions and effluents."

"a good ideal of plant maintenance time is spent on roofs. A flat factory roof is not only leak-prone, and thus a potential quality problem, but is usually end-of-pipe for emissions into the atmosphere and often the start-of-pipe for air coming in. flat roofs are often laden with equipment so that maintenance workers are assigned full time to the roof."

"the five steps of workplace simplification in brief: [1] simplification; [2] everything in place; [3] cleanliness; [4] full participation; and [5] disciple. The most dangerous workplaces for both safety and environmental damage are rife with spills and sloppy labeling."

"one of the major thrusts of Total Quality Management is better prediction and control of all kinds of operations, thus working out mysteries and eliminating surprises. For example, when Davidson Rubber began to involve employees in working on quality problems and starting JIT practices, lost-time accidents dropped form forty-four one year to none the next."

Environmental Benefits of 'Manufacturing Excellence' Practices

Practice	*Example*
Flow-diagram methods to overview and improve total processes	Can make sure that environmental (as well as other) waste is eliminated from a total process rather than shifted to another point in it.
Returnable containers	Almost no cardboard is now Discarded by the Saturn Plant (auto), Or many other plants. Returning containers costs fuel and time, but so does hauling new, used, and recycled cardboard. Ashland Chemical has empty Chemical drums sent back. Saves drums and saves waste disposal by customers
Minimum inventory	The less material, the less hazard. Methyl isocyanate is an intermediate. Technically, it could be used Immediately.
JIT, order only for immediate use	Overages must be stored. Eliminate Disposal or return of unused material.
Fail-safe methods, a major principle of doing it right the first time	Fewer defects mean less scrap to discard, less rework energy, less energy correcting field problems, and higher reliability products (slightly longer life).
Reducing plant floor space	Saves on materials of construction, energy to heat, material handling energy, wasted real estate, etc.
Cell manufacturing	Less material handling, fewer defects, less inventory.
Design for manufacturing	This usually results in fewer parts, and often simpler ones. Translates to less material and energy uses as well as less cost to the customers.

"innovation is process, not a product."

"in fact, circumstances that enable a technical concept to become an established practice may not come together until decades after the technical concept is born. The best-known inventors, like Edison, Ford, and Lear, have been unabashed popularizers and promoters as well as persistent, diligent, and ingenious."

"innovation is not a product. It's a process, and a group process at that… an innovation process is now expected to be a nearly perfect experience from the beginning of full deployment. No more nuclear power plants without a clear plan to store or recover spent fuel rods, for instance."

"for example, a small research institute recently broke apart because its directors did not understand it the same way the academic directors thought it should be a source of resource funds, the business directors thought it should be a source of profitable spin-off ideas, and the government directors thought it should be a source of new jobs. None of the concepts of a fully deployed innovation process were very comprehensive."

"suppose an inventor has a bright idea for re-manufacturable lawn furniture. Designing the furniture itself is as much a matter of taste as technology, and probably not patentable. Coming up with exactly the right kinds of materials is a systems problems. Possibly the chairs will be leased, not owned, so organizing the distribution and recovery system for chairs is not a one-company enterprise. Would this concept have any intellectual capital? If so, who should own it? A system design is virtually non-patentable, and numerous participants contributed in ways both large and small. Today's business practices are awkward when they try to cope with this situation."

"intellectual capital is any know-how that can be sold"

"ideas themselves are a dime a doze. Ideas have value only when they are refined and combined through a process of innovation into real products and services."

"companies participating in consortia have several common dilemmas. One is whether to commit top technical talent to consortia projects or to internal work on which the time to intellectual capital is exclusive. Another is the fear that competitors or near-competitors will learn about the company's new product and process developments, so discussion is limited to pre-competitive technology. Another is how fast to rotate representatives on consortia projects. High turnovers leads to difficulty sustaining long-ranged consortium direction and momentum."

"people from different companies must get to know each other. Suppliers, competitors, customers and non-corporate organizations provide a mix of people who come from different organizational cultures. It takes time for a work group to gel."

"despite the problems, American manufacturers are much more open with each other than they were only ten years ago. However, access to research is only the start of new products and processes… the race goes not to those who try to sit on intellectual capital but to the swiftest and surest at taking new concepts to market."

"technical competence and some experience on a team are vital, but so is a common bond among the members. Facilitators or even 'social' meetings can help to coalesce inexperienced or immature teams, preferably early in the project."

"better to have people concentrate on a project, finish it fast, and move on, than overcommitted to several projects at once and behind on all of time."

"the Association for Manufacturing Excellence has been noted for holding one-and-a-half-day workshops at host-company facilitates. During the first half-day the host explains its improvement process and its goals. The second half-day, visitors tour the working areas and talk with workers. The third half-day is a continous-improvement session. Visitors share how they are tackling the same situations as their host. Both individually and in groups, they

offer ideas to the host for further improvement. Over time, the focus of the workshops has shifted from techniques to the human relationships that allow new practices to be successful."

"the success of a workshop depends on establishing an open dialogue. The host ahs the right to exclude direct competitors. The host work force may not tell everything, but they come close. It is impossible to coordinate a deceptive pitch in detail in an open visit through a host facility."

"if a workshop host's work force is enthusiastic, its members immediately generate an open attitude among the visitors. Visitors begin to share their shortcomings-their secrets- with other present. If the same people attend several times and begin to trust each other, they open up a great deal more. Simple as the experience is, it is the beginning of an open system."

"only two workshops out of a hundred or more have been complete 'busts'. Both times, the host's marketing department took control of the meeting to present its company in the best light."

"by contrast an operations facility with nothing to hide may become a marketing tool in itself if prospects are taken to the working areas. If workers in shops and offices simply explain how they handle the customer order they are working on at the time, that is often enough to clinch a deal. Williams Technologies is only one of a number of companies that have let the facts that their workers do the selling. In contrast to a sales pitch, an open system depends on visible evidence, verifiable facts, and the opportunity to directly check many processes."

"learning to participate in improvement processes is inseparable from learning to trust other people- not all of them, but some of them. Learning to base actions on data is as much derived from having trusted sources of data as learning the processes."

"learning begins with a shared vision- noted the same as a vision statement written by the CEO. A vision is a shared process of examine over and over what we really want to achieve. Otherwise, individuals interpret a vision statement however they choose."

"another characteristic of the learning organization is that it tests existing methods…is questioning existing patterns of thought."

"a third characteristic is a systems viewpoint. That is a non-parochial view coupled with systems sense- analyzing interactions and processes rather than being driven by events- learning to examine what is happening, rather searching for the guilty."

"the authors experience is that people in over controlled, narrowly bounded organizations spend their entire working lives circling essentially the same issues, nagging each other, and seldom resolving anything. After a time, they never intend to resolve anything."

"real competition is an execution of service of the customer. Just as in athletic games, one can see what opponents are doing but must execute well enough to beat them, or at lest keep up with them."

“all the competitors learn from each other, thereby strengthening al the competitors as a whole.”

“a learning attitude is probably the most important attribute of a quick study. Quickly giving up old practices upon seeing someone else with better one is the mark of a person to whom performance is more important than position. Lack of a learning attitude, rather than mental rigidities resulting form age, is probably why substantial change is too often must wait for a few funerals.”

“the toughest part of learning anywhere is creating the setting in which it can happen… the proper attitude is one of always being a student, never a guru- never having found the ‘center of the earth’”.

“one of the most popular versions of open-system learning today is called *benchmarking*, a term coined by Xerox for a process it began in the early 1980s.”

“Michael Splendolin proposed the following: ‘benchmarking is a continuous, systematic process for evaluating the products, services, and work processes of organizations that are recognized as representing best practices for the purpose of organizational improvement.’”

“some people confuse benchmarking with competitive or strategic analysis. The best benchmarking is followed by action to make operating practices better. Much of it is conducted by those who do the work. They must be convinced that someone, somewhere, does a better job. They must be moved to match or exceed performance seen elsewhere. That is, effective benchmarking is see-do learning.”

“benchmarking is part of an improvement process.”

“an enterprise is a coalition of individuals and groups that serve the same customers and manage the same cycle of material use.”

“trying to achieve more with less takes more finesse and cooperation than trying to maximize possessions and expand control. Maximizing customer satisfaction is consistent with maximizing growth and profit if resources are expanding. If resources are limited, maximizing customer satisfaction requires collaboration with many partners to expand and extend know-how as much as possible.”

“simplistically, people are thought to work for money. Certainly no one works long without it, except for a paycheck. If the work does not fully engage them, they divert their primary interests and energies elsewhere.”

“despite contrary evidence from the Hawthorne studies onward, many managers’ practicing theory of human motivation remains you-work-I-pay.”

The trouble with Silos, Chimneys, and Pigeon Roosts

1. Hierarchies tend to form around functions. Functional specialization encourages expertise in depth, but it hinders cross functional communication and filters upward communication.
2. Empowerment moves service decisions and improvement processes to low levels for fast improvement and fast response to customers.
3. Hierarchies are centralized. Decision making is remote from problems and distant form customers.
4. parts of a hierarchy can easily be more interested in their own welfare than that of the total organization- or its stakeholders.

"simple hierarchies are formed by everything from ant colonies to elephant herds. Gather a group of strangers around any common purpose, and in short order one or more elected leaders will be conducting a meeting. Complete absence of organizational form leaves responsibilities so vague that nothing happens- or a disaster happens… a major difference between a highly disciplined army and a mob has been the effectiveness of a hierarchical command structure."

"developing an able, responsible, enthused work force is fundamental to any version of open-system enterprise. It is probably the most difficult step. Owners and general managers today are usually frustrated when they try to empower a work force. The key word is *trust*."

"Paul Rimington and Chuck Brewer, co-owners of Diemasters Manufacturing, discovered that 'fake empowerment' did not work. They could not insist that subordinates be empowered. They could not make it naturally evolve from a training program. Finally, their staff asked them to sign a contract to let the associates run the company, and each time the owners interfered, they would be fined $100. the owners accepted, and several infractions later, the associates began to feel that they really were trusted, and still, their transition has only begun."

"trust is not a guarantee. Nothing in this world is guaranteed. Trust is built by 'telling it like it is' and sharing both good times and bad."

"two points: 1st workers have reason to fear job disappearance. 2nd, recognition and positive reinforcement by management is more difficult than most imagine. In a crunch, quality can still be sacrificed to output. Workers seldom hear about customer satisfaction, or lack of it. They feel powerless when suppliers send parts or materials that are marginal."

"what causes someone with little expectation of great wealth to spend extra time, energy, and imagination in his or her work? Recognition. All the most people will ever gain from anything extraordinary they accomplish in their life is sincere recognition by someone who really knows what was done."

"however, the humblest genuine recognition is part of any organization's soul."

"recognition is more than employee-of-the-month pins, dinners, and prime parking spots. Recognition is personal time taken to show respect for others' performance and

improvement-acknowledgment that people have (or have not) dedicated themselves. Symbols associated with genuine recognition are meaningful; perfunctory rituals are not."

"I don't want a lot of bosh; just give a damn."

"not all the recognition need come from management. For instance, when fabrication workers give engineers a "slick toad award" (no warts) for presenting them new tooling that needs no corrective adjustments, the recognition is 'the real thing,' although to outsiders the ritual may be as meaningless as initiation into the Mystic Order of the Sea. Even better is recognition that someone is 'making history'- accomplishing something never done before."

"Performance Management is systematic recognition. Its basic concept is reinforcing behavior or performance that made things go right, rather than giving negative feedback on things gone wrong."

"management today improves the work force, and the work force improves the processes- and satisfies the customers."

"most important is giving recognition where it is due."

"the best companies have always recognized that an excellent work force of any kind is always well educated and well trained."

"among factory workers, one of the first issues when assuming more responsibility is the system for fairly assessing and disciplining attendance, for example."

"a simple point system for attendance seems to be easily enforceable, and co-workers are apt to be more discerning about attendance than a staffer removed from the scene."

"'picking up' is a process of the work force learning to work in teams, performing a number of basic tasks for themselves. Small work groups therefore start to become small business units in themselves. A well-coached team can 'run the business' in their little corner of it. An aggressive team can even become entrepreneurial-come up with ideas that lead to new business."

"a balanced reward system is more attuned to teamwork, broad perception, a long-term outlook, and performance achievements that at first look impossible."

"M. Scott Myers, who has spent a fair amount of his career studying reward systems, has concluded that systems consistent with 'ultimate' performance balance three dimensions: (1) individual monetary rewards; (2) group monetary rewards; and (3) non-monetary recognition, both for groups and for individuals."

"examples of individual monetary rewards are merit pay, pay-for-knowledge, benefit plans (including tuition refunds, subscriptions, and so forth) and premium pay for night work, travel, or hazardous conditions. Group monetary rewards include various forms of gain sharing, profit sharing, stock ownership, and occasional bonus payments to project teams. Non-monetary recognition might include time off, flex time, and opportunities for desired transfers or course attendance, beside public citation on both formal and informal occasions."

“to cut through all this, organizations need champions and change agents. The champions toss out ‘impossible challenges,’ like Motorola’s six-sigma quality goal or a challenge to reduce tooling cost on an automobile by ten times in five years.”

“champions blow proceduralists out of their comfort zones. A champion is a fomenter of revolution, a status much strengthened if he or she is also the chief executive of today’s organization.”

“a change agent shows people how to make a radical change. Emboldened (or bullied) by a champion, people start an earnest search for the ‘how to’. A champion may also be a change agent, but a champion without change agents is all blow.”

“this kind of change is paradoxical. The champion and sometimes the change agent behave like dictators at first. But the nature of the change is to empower the people doing the work with responsibility they never before held.”

“consultants are sometimes major change agents. Manufacturing companies hire expertise they cannot afford full-time, but they also hire consultants to force themselves to make changes that otherwise could not happen.”

“champions and change agents must destroy something old to build something new, so they leave bruised feelings in their wake.”

“the major asset of resource organizations is skilled people who can fit into numerous teams.”

“human development is the key. The best companies have always supported development of people.”

“for an open-system, horizontal enterprise to function, its people must lock onto the same mission and goals. Otherwise, it is gridlocked by confusion or quickly undermined by contradictory agendas. An open system must give careful attention to:

1. common mission and goals.
2. fair sharing of risks and rewards.
3. trust among the participants.
4. acceptance and use of a common improvement process.
5. common systems of communication.
6. common systems of performance measurement.
7. fair rules for entering or departing from the system.

Stages of Customer-Supplier Development

OPEN

- Open-system enterprise
  (resource companies buying into action companies structured for collaboration on specific operation missions.)
- Joint ventures
  (with collaboration on specific operation missions.)
- Partnerships and collaboration
  (mutual improvement processes, risk sharing.)
- Consortia
  (mutual participation in projects or programs of common interest with commingling of funds- the National Center for Manufacturing Sciences of Sematech are well-known examples.)
- Long-term contracts with customers and suppliers
  (stop unnecessary uncertainty in relationships.)
- Open-exchange improvement processes
  (improvement workshops, network organizations, benchmarking exchanges, etc.)
- Informal networking between companies
  (sharing of ideas between individuals.)
- Alliances and industry associations
  (standards setting, industry market research, lobbying, etc.)
- Every business for itself: strictly transactions
  (unmitigated 'competition' in every relationship.)

"decisions based on financial projections often inhibit strategic considerations or mutual improvement processes. When decisions are based strictly on immediate cash flow, firms will outsource a part for a few pennies per part, no matter how vital it is to strategy."

"the most important relationship that must exist with either an internal or external supplier is a mutual improvement process designed to make the overall operation 'world class'- among the best in a world business that increasingly demands ultimate all-performance. That, and not a piece of hardware, is what is really important and what is really 'sold'".

"good customers explain what they want and why. If a supplier can learn how to satisfy the demands of a tough but collaborative customer who gives good feedback, it is better able to please other customers as well. A bad customer is chronically confusing, contradictory, uncommunicative, fickle, and greedy- the kind of company that wants to purchase long-term service as if haggling over roller skates in a flea market."

Characteristics of a Good Customer Company (Circa 1992)

- They demonstrate, by improvement practices and information sharing, the ability to sustain good customer-supplier relationships.
- They have top leadership committed to open customer-supplier relationships.
- They commit to long-lasting relationships.
- They can be trusted-with propriety confidentiality, for example.
- They share a common vision and collaborate working toward it. They seek mutual prosperity through joint objectives and mutual improvement using common measurements and benchmark goals.
- They expect you to make a reasonable profit.
- They are responsive to supplier needs such as accurate billing, on-time payment, timely transmittal of quality feedback, etc.- they ask you what their deficiencies are, and do not punish honesty. –they fix the problems- or try to.
- They help you become a better partner- a better supplier to other customers and a better customer to your own suppliers.
- They 'show you the same face' in all parts of the company- consistent behavior in all functions and activities.
- They maintain open communication. (it's easy to contact engineers, marketers- and their customers when useful.)
- Their measurement of your performance is consistent and designed for your improvement as well as theirs.
- They involve you early in new-product and process development.

"if relationships with suppliers are mostly transactional, having multiple suppliers is a prudent way to maintain control in an environment of distrust. The customer can play one supplier against another, and losing one does not seem serious having a large number of suppliers automatically means that we cannot be a confidant with many of them, and perhaps not with any of them because of the distrust engendered by the methods of keeping suppliers at bay."

"good customers want to be preferred customers of their suppliers, and that is also a selection process."

"a good customer is a good partner."

"a company with close ties to suppliers thinks of suppliers' factories and other operations somewhat as extensions of its own capabilities. Suppliers of materials, tooling, and equipment really work for the customer's factory, but under a different roof."

"auto companies in Japan obtain most of their parts from sole source suppliers with whom they have long-standing relationships, seldom broken unless a supplier falls behind technically."

"one common small step in opening the operating connections is quality certification of suppliers. Many companies do not want to inspect material sent by suppliers. Instead, they want to assure that the quality practices used by suppliers make inspection unnecessary."

"certification requires the customer to review the operations of each supplier. Reviews have become increasingly tough."

"if a single supplier serves ten major customers, all ten may troop through periodically for operations reviews. If each of the ten has independently developed its own detailed expectations down to the formats of records used, the paperwork and reviews are an enormous waste to the supplier. Each customer is paying for excessive overhead just to comply with its own audits. Furthermore, the documents each one reviews may be eyewash, not what the suppliers actually use."

"each customer can review performance scores and determine whether it wants to take any action."

"performance assessment is not a one-way street, customer-to-supplier. Suppliers should also rate customers. Improvement processes are two-way, and performance rating should be also. When a supplier does not perform well, it ma be that the customer is not performing well- not communicating and engineering changes accurately and on time, for instance."

"the crucial elements of an open system are commitment to improve performance and action to do so."

"the pressure that will drive organizations to the next stage of collaboration will be the need for 'excellence' in all phases of operations throughout a network- virtually error-free cyels of material use."

"measuring, tracking, and actually *improving* performance is a highly disciplined process, and failing to do so is easy to excuse away."

"the way performance measures are used is as important as what measures are used- and probably more so."

"excellence is created when the people doing the work directly pay attention to the details and improve processes until they do not have to pay constant attention for everything to go right."

"one of the most common examples is a restaurant owner who can run one location well by constantly nipping and yapping at the help. If he opens a second location, he does not know how to behave."

"properly used, most measurements should assist someone to better meet the mission of an enterprise… well-employed measurements lead to corrective action or to permanent improvement. Substance wins out over form."

"most measurement should help someone *do* something better. Otherwise, the measurement itself is waste… shorter and more accurate order processing, elimination of out-of-service filed calls, product designs, reduced materials movement- something that usually can be represented by a measurement some way."

"measurement for improvement are often detailed and represent a small contribution to an overall mission."

"top-down measurement are for control. If done well, such measurement only indicate whether major processes are meeting objectives… well done, a leader develops people, and people control work processes. It's not as easy as it sounds."

"when asked why so many orders were over due, the customer service manager's response was enlightenting 'most customers add six months or more to our quoted lead times because they know we are always late! We do not want to build too soon because once their projects have moved to where they really need it, they might change the order.'"

Types of Performance Comparisons

1. *Comparisons with our own past performances*.
2. *Comparisons with other's performance, or benchmarking*. (Benchmarking is the antithesis of not-invented-here thinking. It seeks to learn from the best practices of others.) comparative learning, or benchmarking, is described in many ways. One of the better framework is by Michael Splendolini, who explains it in five steps:
    a. Determine what to be benchmark.
    b. Form of benchmarking.
    c. Identify benchmark partners.
    d. Collect and analyze information.
    e. Take action.
3. *Comparison with customer needs or with mission of enterprise.* (have performance measures that center on customers.) Measure the extent of customer satisfaction has proved to be unfulfilled challenge of companies that have won the Baldridge Award.
4. *Comparisons with ultimate performance.* Setting a goal of perfect performance (like absolutely zero defects) seems impossible unless people understand how it is possible for them to reach it.

"a number of operating-performance measures are kept for review and control. Efficiencies, sales quotas, budget variances, and the like are usually part of control methods."

"attention can be given only to a few improvement processes at a time. However, performance measures should be kept on many processes from many perspectives. True performance improvement is shown by a favorable change in one or more indicators with no corresponding unfavorable changes in another."

"for instance, the time to ship orders may be decreased simply by adding people and having a decline in productivity and perhaps in quality. The decision may be good business, but it is a trade-off decision. Process improvement should not be a trade-off."

"measures used for improvement should relate to the overall mission of the enterprise or to a fundamental improvement goal."

"one of the primary missions-always-is customer satisfaction."

"we measure what we think is important."

"the kind of measures that seem important depend first upon which stakeholder is being served. Ownership questions differ from those asked by customers and from those asked by

suppliers. Each stakeholder and each function within a company is likely to pay much more attention to some measurements that others."

Examples of A Balanced Array of Performance Measures

1. Quality
2. Dependability
3. Resource Use
4. Environmental
5. Flexibility
6. Human-resource Improvement
7. Innovation
8. Financial

"no single metric is a 'magic answer,' nor is any single category of metrics."

"you do not get what you want, you get what you measure… measures reflect our objectives and our comprehension of processes."

"establishing performance measures helps to clarify what people need to do."

An Example Performance Rating Using a Maturity Index

Considerations:

a. there is a system for certifying suppliers
b. there is a process which ensures continuous quality improvement of procured material and services and the rewarding of suppliers for their involvement in programs.

Scoring for Element 3.9

Poor:	there is no supplier improvement program.
Weak:	the organization is beginning to define their needs for supplier quality improvement. A few areas of the business are working with specific suppliers to improve the quality of procured materials.
Fair:	a program has been defined for the continuous quality improvement of procured materials and services. Some major areas of the business actively utilize this program with their key suppliers. Some managers are supportive of supplier quality improvement efforts.
Marginally Qualified:	the organization's procured materials and services quality improvement program includes supplier certification procedures and criteria. Most areas of the business participate in the program and a few suppliers have been certified.
Qualified:	most of the organization's suppliers are active in the supplier quality improvement program. Many key suppliers are certified. There is evidence that the supplier improvement activities are having positive results on total cost of quality and improved product quality.

Outstanding: the supplier quality improvement program is exceptionally well defined. Certification of suppliers has resulted in quantified cost savings. There is evidence that certified suppliers are rewarded as preferred suppliers when making sourcing decisions. All suppliers are involved to some extent in the certification and/or continuous quality improvement.

Achieving Quality of Life and Enterprise Visions is a Cumulative Development of Ourselves

Quality of Life
Flexibility or Agility
Waste Reduction
Quality
Basic Development of everyone in an enterprise in all position, from top leaders to trainees.
Creation of an 'enterprise culture'

"the leadership group may initiate a vision, but it must communicate it so that others participate in it, or else the vision is not driving anything. A vision becomes more specific through performance measurements."

"a driver should measure processes, not human performance per se. As Dr. W. Edwards Deming notes, measuring human performance has limited effect if people are not in a position to influence the processes with which they work."

"to start a system of measurement, the leadership must covert a vision to a specific mission, or a series of them over time, then devise a soundly conceived performance driver for each mission."

"from gain sharing to profit sharing to stock distribution, the variations in plans to give associates an interest in the financial success of an enterprise are infinite. None is perfect. The trick is to build a system that gives associates an interest in their own long-run security- an assurance that the system as a whole will not run down or deflate."

"the hitch of profit sharing or employee partial ownership is that many employees are not entrepreneurial, nor do they necessarily exercise long-term judgment. If they like sharing in profits, but not losses, organizations dominated by employees are even worse if they want to pay themselves the money and not use it to promote their own future improvement."