Processes, Automation and Human Potential

Geir Isene

g@isene.com
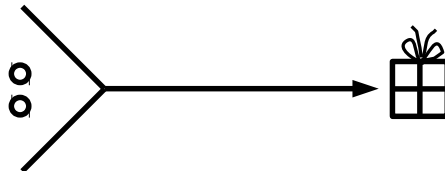
http://isene.com

assisted by

Brendan Martin

inspired by

Hans Trygve Kristiansen

Ragnvald Blindheim

The Norwegian Meteorological Institute

Eliamani Sedoyeka

The Barabaig in the village of Endesh

editing

Marilyn Abrahamian

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Abstract

The following article attempts to illuminate some important aspects of business and organization, such as:

What can and should be automated?
When should you trust people rather than processes?
What is responsibility and how can you ensure the intended production?

This article tackles the basis for automation, processes and human potential for reaching goals.

Document link: `http://isene.com/process.pdf`

1

1 The basis of processes

1.1 Background

> *"One man draws out the wire, another straights it, a third cuts it, a fourth points it, a fifth grinds it at the top for receiving the head: to make the head requires two or three distinct operations: to put it on is a particular business, to whiten the pins is another... and the important business of making a pin is, in this manner, divided into about eighteen distinct operations, which in some manufactories are all performed by distinct hands, though in others the same man will sometime perform two or three of them".*[1]

Ever since Adam Smith described a pin factory in the late 18th century, business processes have been the focus of countless managers. All manner of businesses have been subject to processes in an effort to industrialize production. The main rationale behind this drive has been to look at an organization as a machine that can be fine-tuned for optimum performance. It is an effort to automate on a gradient scale:

- full automation, as with robots and computer programs (web shop with a robot stock system)
- partial automation where work is strongly assisted by tools (industrial food production)
- manual automation with formalized business processes (most large businesses)
- manual work assisted by guidelines (most small businesses)
- pure manual work (most sports and creation of art)

Some work lends itself better to automation by being easy or profitable to automate. Other work is better left in the manual range, as we will explore in this article.

Frederick Taylor introduced "scientific management"[2] as a means to automate business and control employees' work down to minute details. It stands as one of the most remarkable efforts of automation in the history of business management.

Several types of businesses have utilized the assembly belt philosophy with great success – the car industry being a prominent example. Henry Ford pioneered this concept with the T-Ford, while one of the world's largest car manufacturers, Toyota, owes much of its success to automation and the fine-tuning of processes. The Toyota Production System has received such an abundance of accolades that the system itself has been the object of export – not only to other car manufacturers but to entirely different industries, such as Information Technology.

The success of Toyota and the like has prompted several process frameworks for IT, ITIL[3] being the market leader. With the success in the manufacturing industry, the idea of processes is very seldom questioned. A whole branch of consulting companies specializes in process management, whether it is ITIL, Business Process Management or other ways to implement and improve processes. They go to town with their customer's ways of work and focus on improving efficiency and reducing risk by fine-tuning the way products and services are delivered.

They sometimes succeed, but often the gain is minimal, nonexistent or in some cases negative. There have been cases of consultants hobby-horsing the process philosophy to the detriment of their customers. One reason for such failure could be the fact that process implementation or improvement comes in way down the list of priorities for most businesses. Attacking a low priority area while ignoring more important business factors may lead to negative business impact.

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[1] "Wealth of Nations" by Adam Smith; http://www.classicreader.com/book/770/2/

[2] Scientific management: http://en.wikipedia.org/wiki/Taylorism

[3] IT Infrastructure Library; http://en.wikipedia.org/wiki/Information_Technology_Infrastructure_Library

Above the focus on processes, we would find other priorities, in an unordered list such as:

- Is the business operating in the right market?
- Does the company deliver the right products or services?
- ... to the right customers?
- ... with the right suppliers?
- Do they have the right personnel?
- ... with the right competence?
- ... with enough initiative and creativity?
- ... and with sufficient sense of responsibility?
- Does the company have the right management?
- Is the company organized in the best way?
- ... with optimal responsibility sharing?
- Do the marketing and public relations generate the required impact?

Focusing on HOW a company goes about doing its work without assessing whether the work SHOULD be done in the first place could very well be a waste of resources. Also, organizing the wrong people in a right process could lead to striking failures. It may serve us well to keep in mind these quotes from Peter Drucker:

> *"There is nothing so useless as doing efficiently that which should not be done at all."*

> *"Efficiency is doing things right; effectiveness is doing the right things."*

Whereas process consultants should be painfully aware of the above, there is yet another reason why a process implementation or improvement could fail: the Business Case may not validate a formal process in an area. Introducing the Business Case as senior to the concept of process should come as no surprise, as it is the very reason for a business investment. It dictates whether one should invest time and resources into any project, including automation, process implementations, and improvements. In companies dealing mainly in knowledge, such as IT, advertising and law firms, the percentage of processability is much lower than in the manufacturing industry. Surveys show that only 20%-40% of the tasks in a knowledge business can be successfully covered by formalized processes. The remaining tasks are either so emergent, unrepetitive or complex that they do not lend themselves to processability[4].

Neither automation nor the implementing of business processes are silver bullets. They are tools that in some cases have immense value for a business and in other cases may destroy a business. Knowing when to automate or implement a process and to what detail is a skill gained with years of experience and mandated by a proper Business Case.

In order to fully understand the ramifications of automation and introducing processes in business or other areas, one must first tackle the basic principles of automation, processes and human potential.

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[4] "Mastering the Unpredictable: How Adaptive Case Management Will Revolutionize the Way That Knowledge Workers Get Things Done" by Keith D. Swenson

1.2   Introduction

With every process we have input, output and change in between, even if only the lapse of time. This is true for any process, be it the shipment of gold from one country to another, the manufacturing of a car, a political debate or the baking of a cake. With Toyota the immediate output is cars. In the bigger picture output is profit, and in the long run it is sustainable growth. Output is the result of Change applied to Input and can be of positive, neutral or negative perceived value.

INPUT   CHANGE   OUTPUT
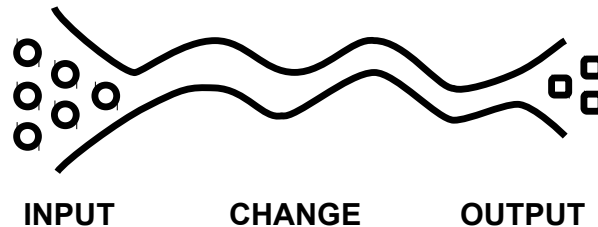
Input and output have only two basic properties: Value and Variance. Value can take on many forms such as weight, temperature, solidity, purity, color, sweetness and loudness and pitch. All of these are values along a certain dimension. And whenever there is more than one input, there is Variance to the values.

If the process is that of baking an apple pie, we have several ingredients as input – as well as the recipe, the kitchen utensils, our knowledge and more – with apples being a main input. Apples have certain values that make them suitable for use in baking a pie. And there is variance in these values among the apples.

Change takes on two forms: Motion and Decision. When we move an object, we change its position in time and space, and we may change its form. When we boil water, we energize the water molecules so that they move very fast, turning the water into steam. When we move a car very fast into a brick wall, we change its form. An input's values are primarily changed by the use of motion.

Moving gold from one country to another will probably change its value. Moving a car into a brick wall will have a dire effect on its value.

If you have a bucket of many different-colored marbles, you can mitigate the variance by decision. The green marble goes into the small bin numbered 1. The red marble goes into bin #2. The blue into #3. And so on. After many such decisions you have bins with only one type of marble in them and the variance is thus changed.

| **INPUT**	**CHANGE**	**OUTPUT**
Value	Motion	Value
Variance	Decision	Variance
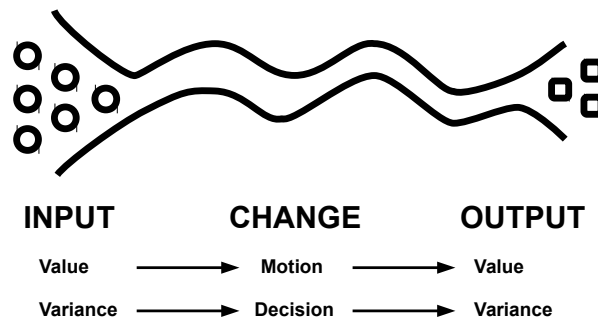
While it is true that Value is primarily changed by Motion and Variance is primarily changed by Decision, Motion can also affect Variance, and Decision affects Value. Appendix A covers this from a mathematical perspective.

1.3 Fixed process versus fixed output

One can focus on the process and one can focus on the output. In certain situations you aim for a fixed process. This means no variation to how the actions, i.e. the changes – motions and decisions – are done. A typical fixed process is a school exam. All the students are given the same questions, at the same time, with the same time limit, using the same tools, and are judged by the same standards. The process is fixed, the motions are rote. Our democratic system of casting votes and our judical system of determining guilt are other examples of fixed processes. When the process must remain fixed, we have Testing. When we aim for a certain output, we have Production.

TESTING
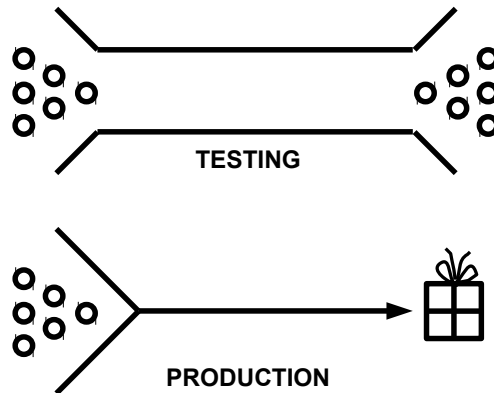
PRODUCTION

While these are the two extremes, there exist all shades in between. The effort to automate production is an effort to standardize processes to attain a fixed output. This remains a fairly easy task as long as the variance in the input is low and remains known.
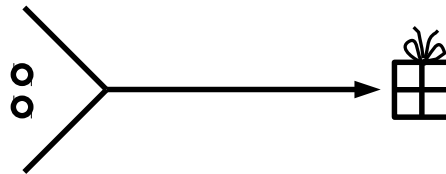
Low input variance requires a shallow process that needs little mitigation of variance. The process is thus relatively simple and the cost of automation low. When we talk of automation here, we consider the full range from computer programs and robots to more manual standardizations through formal business processes and checklists.

If the process is to tackle a high input variance, it must have greater depth, more decisions and will be more complex. Such a process is harder to automate.
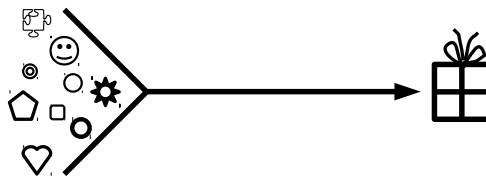
A process can have such a great variance in its input that it is virtually impossible to automate. Just think about everything that could possibly happen in front of a hotel reception counter. A person could come into the hotel with any one of a million different questions, could behave in thousands of different ways. And when you think you have made a list of them all, I can assure you the list would not be complete. Humans are unpredictable.

Mitigating human input may be the hardest of all.
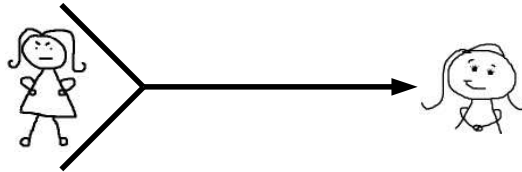
A major question in modern business is what to automate and what to leave to human intervention and responsibility. What justifies automation?

Automation can execute both motion and decision. A robot can move a marble. It can also evaluate color input and thereby decide which bin a marble should be moved to. A computer program can decide on where data should be moved and also execute that motion.

Humans have an additional capacity – that of creation[5]. While a robot can emulate creation, it will fundamentally only do what it has been programmed to do. Human creation goes beyond mere automation, as humans possess purpose or will. One may debate whether creation should be included in the concept of Change in addition to the properties of Motion and Decision, but in the scope of a process and Input and Output, creation is an entirely different capacity.

The capacity for creation or creativity is what sets man apart from machine. Creativity is required to handle unknown input and mitigate that variance toward a fixed output.
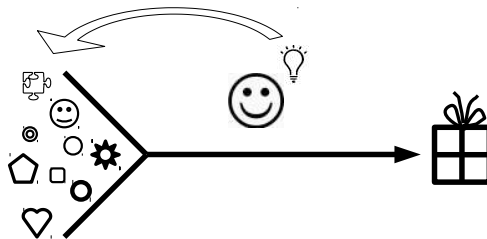
If you only have known input or have mitigated any unknown input with a filter that stops unknown input from entering the process, you can have a fixed process producing a fixed output. An example of such a filter is a web input form that ensures only certain values can be entered and forwarded to a process. Such a fixed process resulting in a fixed output should be automated, if only to ensure that

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[5]This is substantiated all the way down to Quantum Mechanics, where consciousness seems to play a direct role in creating the world it sees; Quantum Enigma by Bruce Rosenblum and Fred Kuttner; http://quantumenigma.com/

human potential for creativity is not wasted on rote work. A fixed process allows for no freedom and effectively kills responsibility as well as enjoyment and fun in the workplace.

People have different levels of need for predictability. Many daredevils will thrive in an environment virtually devoid of certainty and predictability. Most people will be satisfied with a balance between certainty and unpredictability. Perhaps nobody would be happy in a totally predictable environment.

With unknown input entering you cannot have a fixed method or process that generates a fixed output. This is covered in a branch of mathematics known as General Systems Theory and is in accordance with Gödels Incompleteness Theorems[6] that tell us that no system can be both complete and consistent. You must choose: a system that is complete and inconsistent, or a system that is consistent and incomplete. (Or you can opt for an inconsistent and incomplete system, but who would want that?) With unknown input you must decide whether to accept and allow for a variable process or a variable output.
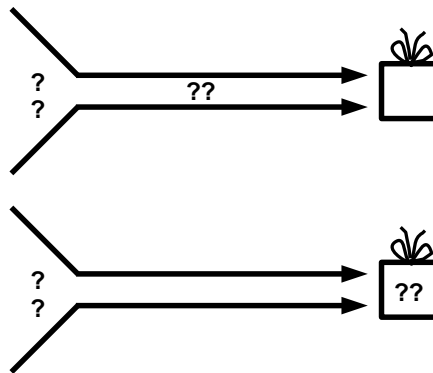
If you want to achieve a certain output, then the purpose of seeking the output must remain senior to the process, method or tool. When the focus shifts from the output to the process, a corrosion of responsibility, creativity and initiative may well ensue. Roteness in method or process can only consistently produce the desired output when all possible inputs are catered for by the method or process.

When the emphasis is on "following procedures", "executing orders" or "process compliance" rather than personal responsibility for achieving a certain output, you foster the mindset of Testing rather than Production. Frameworks such as ITIL and PMBOK[7] should never be emphasized more than the Business Case justifying their implementation. One should work out what the intended output is and then seek to do the tasks and use the tools best suited to help produce that.

As long as the person responsible is producing what is intended, that person should be given the opportunity to continue. Only if the output fails should a senior correct any steps taken between the input and the output. If all input variance is mitigated by the process, then automation has succeeded and human potential, especially the potential for error, has been eliminated.

If you have unknown input but want a fixed output, then you must allow for a flexible process. And a flexible process requires creativity.

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[6]World's shortest explanation of Gödel's theorem; http://blog.plover.com/math/Gdl-Smullyan.html

[7]Project Management Body of Knowledge; http://en.wikipedia.org/wiki/A_Guide_to_the_Project_Management_Body_of_Knowledge
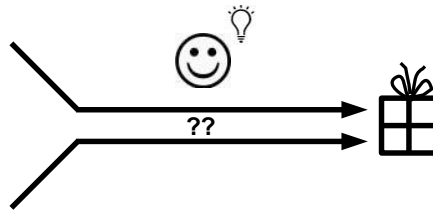
Creativity can also question everything we do. It can question the input, the process and whether the output is really what we should aim for.
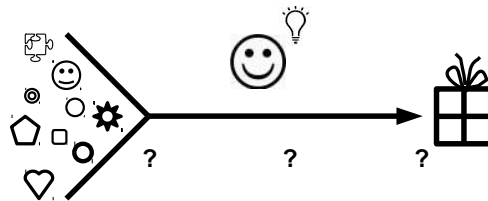
Creativity is a potential. Its application can result both in great products and in disasters. Creativity represents a risk but if enlightened, it can change a company or even a society for the good.

In production, it makes sense to first figure out the exact output wanted and then use the method – tools and processes – to best produce it. This requires creativity and responsibility for producing the given output.

1.4   Responsibility

The person responsible for achieving a certain output must be able to mitigate unknown input. Responsibility ultimately boils down to three factors.

Purpose

RESPONSIBILITY

Opportunity   **Ability**
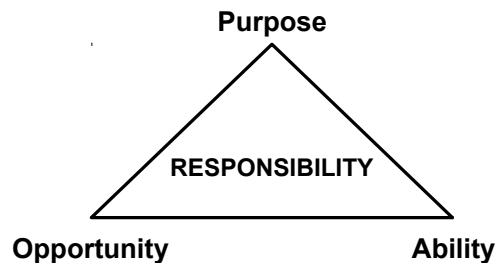
   To be able to take responsibility for the achievement of a certain output, the person must have the opportunity, the ability to execute and the purpose to do so. This parallels Dan Pink's concept of Autonomy, Mastery and Purpose[8] but extends the scope of Autonomy to include all facets of Opportunity and the range of Mastery to include abilities all the way down to a beginner struggling with the first small steps on the way to mediocrity.

   While this article aims for the more positive aspects of responsibility, the above triangle parallels that of a murder investigation: The suspect must have had the opportunity, i.e. no solid alibi. He must also have had the ability to perpetrate the crime, e.g. if the victim weighed 300 pounds and was thrown over the high railings on the 11th floor and the suspect is a feeble young lady weighing in at 95 pounds, we can conclude with some certainty that she didn't murder the guy. Finally, the police must establish a motive, i.e. the suspect must have had some kind of purpose for killing the victim.

   Aristotle early on gave a precise definition of responsibility[9]:

   "Aristotle's discussion is devoted to spelling out the conditions under which it is appropriate to hold a moral agent blameworthy or praiseworthy for some particular action or trait. His general proposal is that one is an apt candidate for praise or blame if and only if the action and/or disposition is voluntary. According to Aristotle, a voluntary action or trait has two distinctive features. First, there is a control condition: the action or trait must have its origin in the agent. That is, it must be up to the agent whether to perform that action or possess the trait – it cannot be compelled externally. Second, Aristotle proposes an epistemic condition: the agent must be aware of what it is she is doing or bringing about."

   This requirement of "voluntary action" and "awareness of action" is what makes it unlikely that a robot that happens to kill a human will face a court of law for its "crime". While automation has no own purpose for its motions and decisions, a human can have purpose and can therefore be responsible for achieving a certain output. A computer program, robot or process cannot.

   Failure of purpose is all too often blamed on a lack of ability or opportunity. A person responsible for achieving a certain output will most often blame money or time for not reaching a target. While this may often be the truth, even lack of will or ability will often be attributed instead to poor opportunity.

   Given a strong purpose, abilities will be acquired and opportunities will be fostered and taken.

   It should be noted that any enforced restriction, no matter how well validated by a sound Business Case, may eventually end up as a justification for a failure. If the one responsible is restricted in exercising his or her responsibility, that person may well end up blaming the restrictions for not being able to produce the intended output, even when the restrictions factually did not hinder or may even have aided the production.

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   [8]Daniel H Pink; Drive; http://www.danpink.com/drive
   [9]"Moral Responsibility" by Andrew Eshleman: http://plato.stanford.edu/entries/moral-responsibility/

Business is often geared toward creating opportunities and enhancing abilities. We hear of Governance Strategies and Sourcing Strategies. But seldom do we see companies that strategically target the most elusive, yet powerful corner of the responsibility triangle – the creative purpose.

Opportunities are tackled through Governance, Marketing, Sales and Vendor strategies. Ability is tackled through Hiring, Education and Training strategies. Purpose is enhanced by inspiration. Few companies have an active Inspiration strategy.

1.5   What to automate

A general principle for automation would be to automate everything that pays off. But how do you figure out what pays off? Or what pays off the most and should be automated first? Automation can be highly beneficial. It may also be very costly. You should automate when:

- the process is repeated often (as in car production)
- the process is not too complex (as in baking bread)
- the gain outweighs the cost (when walking 100 kilometers each day, a car could pay off)
- security of repetition is important (when using a checklist before an airplane is to take off)
- the process does not limit valuable creativity (do not automate brainstorming meetings)

Technology continues to enable strong Business Cases for automation where previously it was too costly or even impossible. It seems that the world is converging to a digital scene where that which can be automated will be automated, marking the boundary for the uniqueness of a human.

Appendix B contains a more in-depth analysis of the factors to evaluate when considering automation – whether it is a full automation through robots or computer programs or more manual automation with a business process or checklists. It includes an equation making it possible to calculate what to automate.

Instead of automating, you should trust human intellect and creativity when:

- dealing with unknown input (as in a hotel reception)
- the process is too complex (as in a hotel reception)
- "purpose" and "will" have business value (as with a soccer coach)
- creativity is important (in the creation of art)
- "responsibility" is valuable (police work)

What you have not automated and when relying on people, you should focus not only on responsibility but 100% responsibility – one person being fully responsible for producing a certain output. The ideal scene would be to have no responsibility holes and no overlap, with the former being the most important. A neat responsibility map that covers the whole operation. Whereas this is probably a utopia, it nevertheless serves as a goal to aim for.
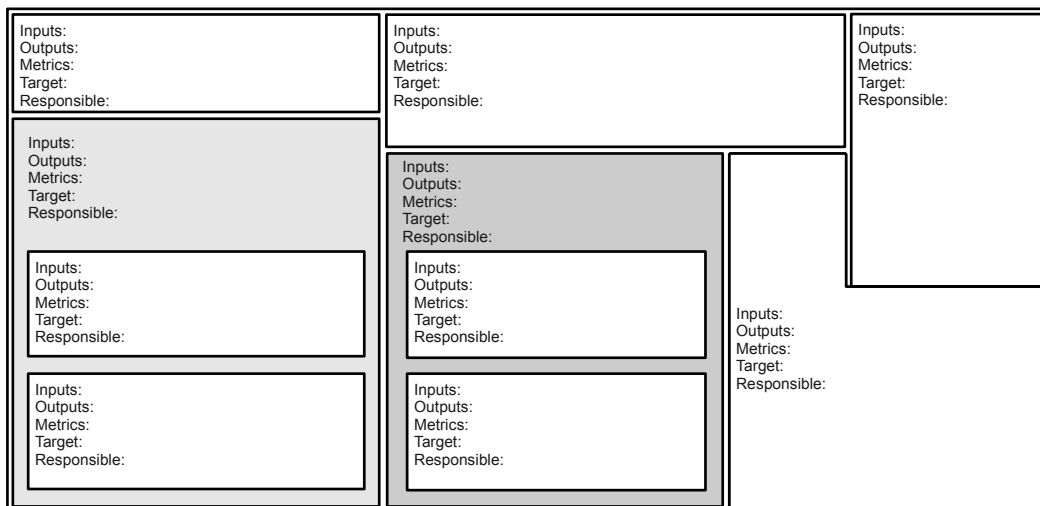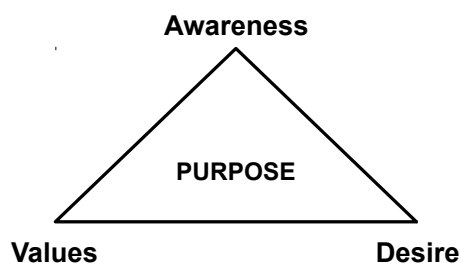
1.6   A culture based on 100% responsibility

Authority, responsibility and accountability are merged in the concept of 100% responsibility. It is unfortunate that these terms have been separated in business as this tends to cause friction and confusion in an organization. We often hear people complaining that they have responsibility for an area without the needed authority to accomplish the output. Or that one person is responsible for an area, whereas another is left accountable. These situations cause much frustration in the everyday business.

To foster an organization of 100% responsibility, one must:

- define and communicate the intended outputs for the group clearly
- define clearly and gain agreement on intended individual outputs
- keep job descriptions to a minimum and focus on outputs rather than tasks
- prepare the environment by avoiding areas of contention – responsibility holes and overlap
- keep the environment as unbureaucratic as possible
- keep every process or standard as simple as possible
- give opportunity and authority
- hire competent people with a real purpose to take responsibility for creating the defined outputs
- build competence in the people
- inspire a strong purpose for the group and for each individual
- inspire creativity and initiative
- let people be themselves
- let people get on with it as long as they produce the defined outputs
- correct only when the defined output is not achieved as agreed
- trust people
- trust yourself to trust people

The triangle of responsibility forms an interesting tool for evaluation. If a person does not produce a certain output, one can be certain that only three factors can be amiss. Either the person doesn't have the opportunity to fulfill the responsibilities, there is a lack of ability, or there is a lack of purpose. If the person does not have the time, resources or authority to execute the tasks needed to produce the output, it can be attributed to lack of opportunity. If the opportunities allow for the output to be achieved, then one can assess the person's ability. If the person has the required competence, resourcefulness and self-confidence, then it must come down to a lack of purpose. If so, either it is because the person is not fully aware of what should be produced or the opportunities or limitations, or the person doesn't really desire the output, or the purpose does not actually align with his or her own values.

Just as Responsibility has three components – Opportunity, Ability and Purpose – so can these three components each be divided into their own three sub-components. Purpose is comprised of Awareness, Desire and Values.

Awareness

PURPOSE

**Values**   **Desire**

For people to accept a culture of 100% responsibility, each person must be aware of the current situation, the input and the desired output. The person must embrace or desire the output and it must align with the person's own values in life.

Often it is found that formalized processes are not followed in an organization. Employees seem to take shortcuts or circumvent the processes found in the flow charts, much like taking "desire paths"[10]. This happens when a process is contrary to the person's desire to produce the output. He or she will opt to take the shortest path from input to output rather than follow a set process.

Ability is formed by Confidence, Resourcefulness and Competence. The person must have the competence needed to achieve the intended output. He or she must be able to handle unforeseen situations in a resourceful way and must also be confident and trust in his or her ability to actually carry through.

Competence embraces all the needed theoretical knowledge as well as the practical experience. Resourcefulness includes smartness in the area – the ability to swiftly apply one's competence in new ways.

Confidence

ABILITY

Competence   **Resourcefulness**
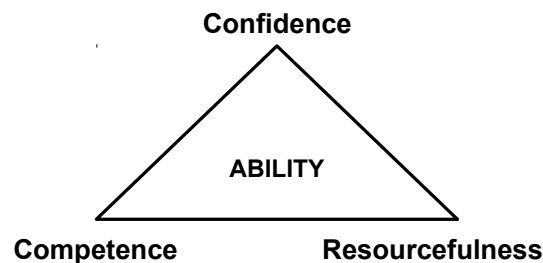
Finally, Opportunity is made up of Time, Resources and Authority. The person must have or prioritize enough time to be able to take the responsibility, must have or acquire the needed resources, and there must not be anyone stopping the person from exercising the responsibility.

Authority

OPPORTUNIY

Time   **Resources**
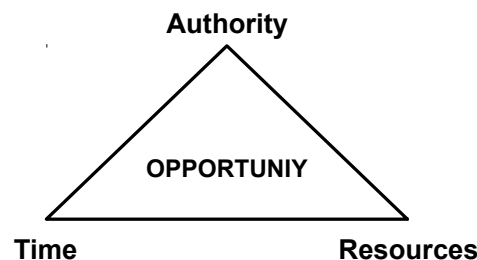
When assigning responsibility, one should ensure these points are all checked:

* Is the person aware of the intended output, current situation and inputs required?
* Does he or she truly desire the responsibility for achieving the output?
* Does the responsibility for producing the output align with the person's own values?
* Is the person confident he or she will make it?
* Does he or she have the resourcefulness?
* Does he or she have the required competence?
* Is the person authorized to take on this responsibility, or will anyone interfere?
* Does the person have the required resources at hand?
* Does he or she have time to do it, or is reprioritizing of time needed?

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[10]Desire paths are also known as desire lines or social paths; http://en.wikipedia.org/wiki/Desire_path

If these points are all checked and positively confirmed, one will have a person with true 100% responsibility.

Conversely, if the production is lacking, one can use the list backwards to debug the situation:

○ Does he or she have time to do it, or is reprioritizing of time needed?
○ Does the person have the needed resources at his or her disposal?
○ Is the person in fact authorized to produce the output? Is anyone interfering?
○ Does he or she have the competence needed?
○ Does he or she have the required resourcefulness?
○ Is the person confident that he or she will be able to produce the output?
○ Does the responsibility align with the person's own values?
○ Does he or she truly desire the responsibility for achieving the output?
○ Is the person aware of the intended output, current situation and inputs required?
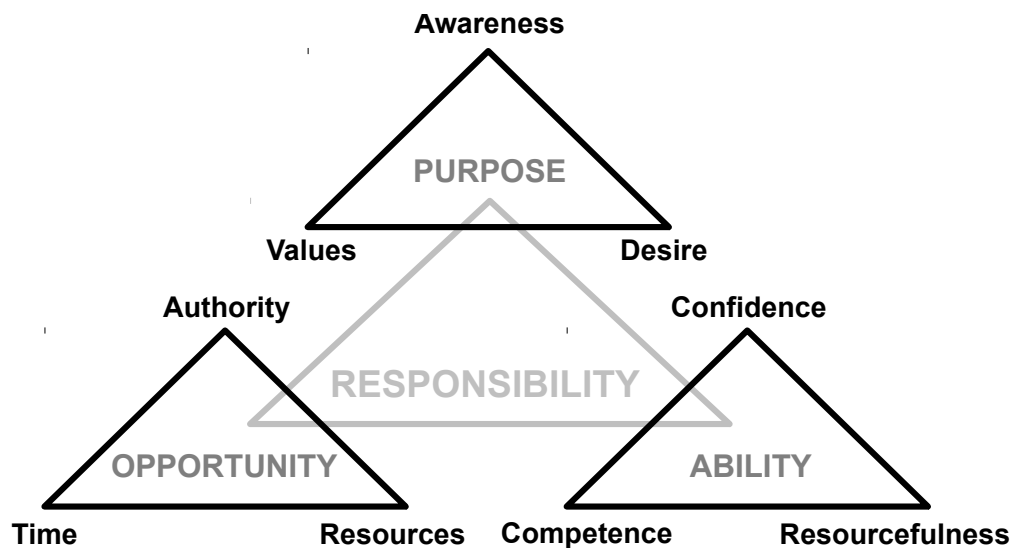
This set of triangles poses an array of questions and areas for further exploration, such as:

• As an executive, how do you best balance the building of Purpose, Ability and Opportunity?
• If lack of Purpose is debugged by addressing its three components, how do you debug a lack of Desire?
• Is there a next level down of triangles – and if so, what would the components be?
• How do you inspire a person to take on new responsibilities that would challenge the person's abilities?
• What happens when one corner of a triangle is much stronger than the remaining two?
• What is the resemblance and relationships between the same corner (e.g. the top) of each triangle?
• What are the ramifications of treating each corner as "input" (top), "change" (right), and "output" (left)?

To bring all of the foregoing to a complete circle – the three corners of the responsibility triangle correlate with the concepts of Change and Creation, in that Opportunity defines the capacity for Decision, Ability defines the capacity for Motion, and Purpose defines the capacity for Creation.

The bottom line is that you should strive to automate anything that is validated by such a Business Case, whether it dictates full automation, manual automation with tools enforcing a process, or manual

work assisted by standard processes, checklists and policies. For the rest, you must foster a culture of 100% responsibility, trust the human potential and strive to inspire intellect, creativity and initiative. And perhaps fun.

Simply put, automate all that is profitable to automate, and for the rest cultivate 100% responsibility. When humans are involved, three principles have proven very effective:

- 100% responsibility
- Simplicity
- Immediate relevance

Seeking simplicity in all processes involving people will release human capital – creativity and intellect – to do what it does best: to create, to question and to handle unknown input. Quoting Albert Einstein:

> *"Make everything as simple as possible, but not simpler."*

Seeking immediate relevance ensures focus and value creation. It does not equate to shortsightedness or lack of creativity. If the task at hand is the generating of a company strategy, then keeping the meeting focused on what is immediately relevant to that strategy ensures a more productive meeting. Keeping all minds highly creative in a mind storming meeting is keeping with the same principle. Immediate relevance is about sticking to the goal. And sometimes it is fruitful to simply let the mind wander and also ensure immediate relevance even in that wild abandon.

In a final note, it should be understood that "output" is not confined to monetary profit. It covers anything from "a happy customer", "brand awareness","better team feeling" and even "fun".

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2 Appendix A. Equations for Change: Motion and Decision

In their simplest forms, Value and Variance are affected according to the following equations:

$$I_v * C_m = O_v$$

$\mathbf{v}$ = value

$\mathbf{m}$ = total degree of motion

$$I_{CV}/C_d = O_{CV}$$

$\mathbf{CV}$ = Coefficient of Variation = σ/μ

$\mathbf{d}$ = depth

The "total degree of motion" is found by multiplying all motions and their effects on the value in question. The "depth of decision" or "total quality of decisions" is found by adding each decision and its mitigating effect on a certain variance. Maximum mitigating effect would be to add 1 to the depth. A process with only motion and no decision would have a depth of 1.

If the bucket with marbles only contains a green and a red marble, the decision to put the red marble in a separate bin would fully mitigate the color variance. Such a process would have a "depth" of 2. We add 1 to the minimum depth of 1 because the decision to split the marbles in two different bins is the maximum quality for that decision. Not all decisions are that clear-cut and decisions more often get a lower quality value than "1". If the bucket contains 20 different colors of marbles and only 10% of them are red, then deciding to move the red marbles into a separate bin only mitigates the variance by 0.1, making the total depth 1.1.

3 Appendix B. Equations for Net Present Value of processability

The value of automation or a process can be described in simple mathematical terms. But first let's look at the three reasons for process implementations:

1. Efficiency (absolute gain)
2. Risk reduction (statistical gain)
3. Other gains

A process may be formalized to make the work more efficient, i.e. to reduce the cost of the task. This type of gain could be labeled "absolute gain", as the process yields this gain every time it is run. A process may also reduce the risk of failure – whether the failure is abysmal, such as an aircraft crashing, or minor, such as a nonstandard product being sent to a customer. This type of gain may be labeled "statistical gain". Again, for every run the process yields this gain. There may be other gains such as compliance or public relations. Some businesses are not allowed to operate unless they have certain processes in place, and this would come under the heading of "other gains". This heading would also cover the gain of being able to brag in marketing material that the business has strict processes for its delivery. The necessity for an airline company to conform to airline regulations is a type of extremely high "other gain". A company's market position may be enhanced by conforming to an ISO 9000 standard[11] and could count as a significant "other gain".

To calculate the gain from increased efficiency, one would multiply the process cost by the efficiency introduced by a process, where "0.1" would indicate a 10% process efficiency to get the absolute gain. To calculate the gain from risk reduction, one would multiply the risk of failure by the cost of actual failure to get the statistical cost of failure. Multiply this by the security offered by a formalized process (where "0.2" would indicate a 20% risk reduction), and you get the statistical gain offered by the process.

The sum of the absolute gain and the statistical gain yields the total gain each time the process is run. The gain becomes as significant as the process gets repeated per year. Be aware that the more detailed the process is, the less repetitive it becomes.

Add the "other gains" produced by the process each year of operation to get the total yearly gain for the implemented process.

Then one would have to subtract the yearly maintenance cost for keeping the process in place. The yearly net gain would be converted to Net Present Value, and from this the implementation cost for the process would be subtracted to yield the final NPV.

Bear in mind that the more detailed the process, the higher the implementation and maintenance costs.

$$v = ((cf + RCS)(r + \frac{r-1}{2}i) + g - m)(\frac{1 - (1+i)^{-n}}{i}) - p$$

$\mathbf{v}$ = Net Present Value

$\mathbf{c}$ = cost of the task one seeks to formalize as a process

$\mathbf{f}$ = efficiency of the process in reducing the cost "c"

$\mathbf{R}$ = task's risk of failure

$\mathbf{C}$ = cost of the task should it fail

$\mathbf{S}$ = security offered by the process, i.e. how much it reduces the risk of failure cost

$\mathbf{r}$ = number of repetitions of the task/process in a year

$\mathbf{i}$ = demand for interest yielded

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[11] http://en.wikipedia.org/wiki/ISO_9000

    g = other gain (positive or negative) from the process summed up in a year

    m = yearly maintenance cost of the process

    n = number of years the process is operative to yield the Net Present Value

    p = process implementation cost

With this equation in place, a proper Business Case can show whether a formalized process for a business area is warranted.

The typical objection to this calculation is that many of the values can be hard to quantify. The obvious answer would be that if the values cannot be quantified, then you do not have a proper Business Case to make a sound decision and it is anybody's guess whether it is financially sound to implement the process. There may be good reason to guess or operate on "gut feeling" when making such a decision, but you should know that that is what you are doing. Pretending certainty about the value of a formal process when the data for the decision is uncertain is no way to conduct sound business.

The processability formula may also be used to verify the Business Case for an existing process and may show the grounds for decommissioning a dysfunctional process.

The third reason why process implementation could fail is that it inherently undermines responsibility. When bestowing 100% responsibility for an area to a person, you must let that person take full responsibility for how the work is done. Of course, you would define the proper outputs from and inputs to the area, but if you tell the person HOW to do the work, you rob him of responsibility. Any failure can thereafter be excused by pointing to the dictations or process that he must follow. Full responsibility means 100% responsibility, and there should be no compromise in that.

You may not want people to take 100% responsibility for an area. A business may be run best with people following strict orders and not taking actual responsibility for the outcome of their work. In that case, the undermining of responsibility is irrelevant.

The often significant process cost of undermining responsibility should be included as a negative value in the yearly gain ("g") in the processability formula.

Let's use the formula in one plausible example:

The IT department within a large company is demanded by top management to introduce processes, automation and the necessary tools to achieve a higher efficiency within the department. The IT Manager studies up on the ITIL best practice framework and is about to embark on a full scale ITIL implementation when he stumbles upon this article. He halts for a day and decides to calculate whether his implementation of Change Management will actually produce a sound economic gain for the company.

He has already drafted a detailed process and decided on the best tool to buy in order to sufficiently automate Change Management. The price tag for implementation: USD 100000 ("p").

The cost of doing a change in the IT department is not very high. Such cost depends on how many people are involved and how often they would have to meet to coordinate the tasks. The external cost of each individual change is irrelevant in calculating how Change Management would influence the cost of doing the tasks involved. However, the external costs do come into play when calculating the cost of failure. Average cost of doing the Change Management tasks: USD 1200 ("c"). Average cost of a change failing: USD 10000 ("C").

The process is not meant to increase efficiency of the tasks per se; it is meant to reduce the risk of failure when changes are made to the IT infrastructure in the company. There are other ITIL processes where efficiency of tasks could be enhanced. In this example, the Change Management process that the IT Manager has designed would actually increase the bureaucracy by about 20% ("f" = -0.2).

The newly designed strict Change Management process should be able to reduce the risk of failure from 4% to 2% ("R" = 0.04 and "S" = 0.5). Such risk reduction of a whopping 50% is what makes the IT Manager really proud of his newly designed process.

There would on average be 10 changes going through the new Change Management process per week – around 450 per year ("r").

Company policy dictates a 5% demand for interest yielded ("i = 0.05").

Although IT is an internal department, the fact that a strict ITIL Change Management process had been implemented could be used as a "bragging card", probably yielding some USD 30000 in yearly goodwill ("g"). This is another reason why the IT Manager is enthusiastic about the process – he should be able to score several points with top management with this element of the implementation.

The estimated maintenance cost for the process, including training of new employees, reminding of old employees and maintenance fees for the supporting tools is USD 15000 ("m"). The process should run as designed for 5 years ("n").

With all these factors entered into the formula above, the IT Manager gets a Net Present Value for the newly designed Change Management process of USD -114932. This would mean that the implementation cost wouldn't be recuperated. Ever. In fact, every time an IT change went through the process, it would cost the company more money than without the process.

He looks at the number in disbelief. . . tries the calculation again. . . and goes back to the drawing board to design a less bureaucratic process that would at least yield a positive NPV.