



Robust services: People or processes?

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Abstract Service systems are inherently subject to variability, whether through customers, service providers, suppliers, or unexpected events. Yet, customers demand excellence and consistency regardless of this variability. In general, there are two ways to handle this variability: with people or with processes. We use the concept of robustness to describe these two approaches, address when one or the other might be appropriate, and discuss how and why one might transition from one approach to the other. Robust people and robust processes within a system can inform and build upon one another in a cycle that mirrors that of continuous improvement. Investing in this cycle can help an organization move toward a system that relies more on robust processes and less on hiring and training robust people, allowing the organization to be scalable while simultaneously creating new opportunities for incumbent robust people.

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1. The service design dilemma

We spend a lot of time and resources on hiring robust people because our processes are weak right now. We are also spending a lot of time and energy strengthening our processes so we

don't have to devote as many resources on finding robust people in the future.

—Dan FitzHenry, GM of Operations, Grit Coffee Bar and Café, Charlottesville, Virginia (personal communication, February 6, 2018)

Service systems are inherently subject to variability, whether through customers, service providers, suppliers, or unexpected events. Yet, customers demand excellence and consistency regardless of this variability. In general, there are two ways to handle this variability—through people or through processes. We use the concept of *robustness* to

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describe these two approaches, discussing when one or the other might be appropriate and how and why one might transition from one approach to the other.

2. Robust service systems

Quality guru Genichi Taguchi calls a process or product robust “when it has limited or reduced functional variation, even in the presence of noise” (Taguchi, Chowdhury, & Wu, 2005, p. 1512). His robust design methodology aims at designs “insensitive to variation in usage, manufacturing and deterioration of products as well as to varying system environments” (Bergman, deMaré, Lorén, & Svensson, 2009, page xi). He is of the belief that the most important quality of process or product design is its robustness against variation. Thus, a robust system produces desired results regardless of the variability in the inputs or unexpected events. In a service system, this means that regardless of external factors outside of the manager’s control, the organization consistently delivers on its value proposition to the customer.

The aim of robustness in a system is to deliver quality to the customer even in challenging conditions. A system that achieves quality in ordinary conditions is a system that achieves the bare minimum; a system that consistently achieves quality even when conditions are not ordinary is better equipped to deliver the organization’s value proposition to the customer over the long term. When a system is designed to limit variation in inputs and outputs, we term that system robust.

Consider the diagram of a service encounter depicted in Figure 1. The service outcome is a function of the design of the service system and two inputs: (1) service requests by the customer and (2) expected variability and unexpected events (external variability). A robust service system consistently provides desired service outcomes regardless of the variability in service requests or external variability. There are two main strategies for incorporating robustness into a service system:

1. Designing and scaling *robust processes*, which are impervious to input or process variability and human error—including user error—and;
2. Investing in hiring and training *robust people* who are able to adjust for variation in the process or changes in the external environment that might otherwise produce a dissatisfied customer.

Operations design thinking has focused on the strategic tradeoffs between investing in robust people versus investing in robust processes. A service system that lends itself to automation can be made robust through process design. A pharmacy that needs to ensure that the correct amount of the correct medicines are dispensed can install a robotic prescription-dispensing system to improve accuracy as well as “manage employment costs and cover peak times without extra staff” (ScriptPro, 2018). A service system that does not lend itself to automation could be made robust through people. Emergency first-response organizations and commercial airline flights that must balance competing priorities or deliver emotionally charged content in

Figure 1. The service encounter

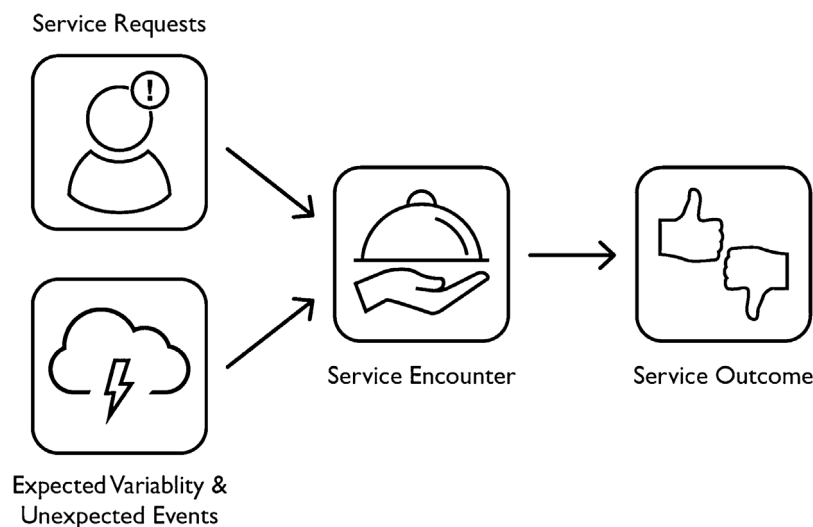
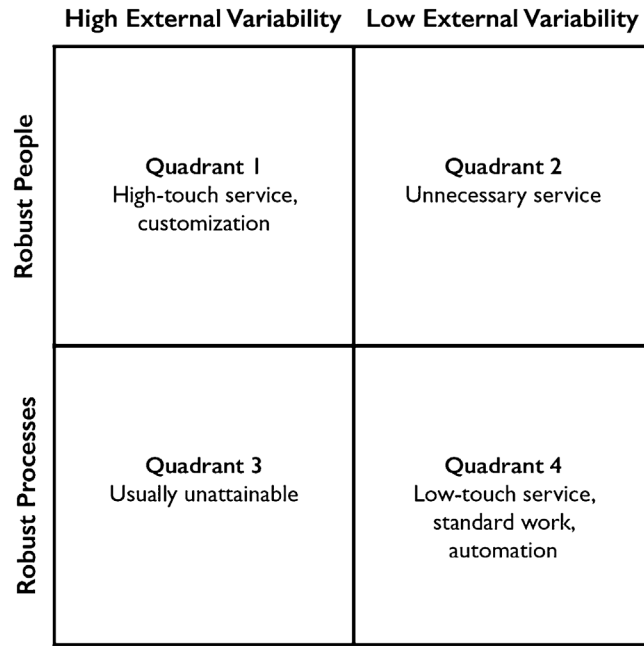


Figure 2. Robust people and processes matrix



a complex and demanding decision-making environment should prioritize hiring robust individuals who will not succumb to pressure at critical moments.

3. Robust people or robust processes?

Figure 2 depicts a taxonomy that can be used to determine whether a system might require robust people or robust processes based on its variability. Services that may rely more heavily on robust people feature one or more of these attributes: flexibility, personalization, and a higher price tag. Services that deliver on a customer value proposition grounded on the delivery of high quantities with minimal product variability tend to rely more on robust processes. Table 1 summarizes the types of services that tend to require each type of robustness and Table 2 shows some examples of each.

Note that these conditions can change over time and inform one another. A startup may rely primarily on hiring robust people to perform multiple roles when it comes to role description and quickly adjust to changes in customer order quantity or specifications. A robust employee has the ability to understand the impact of his/her choices and behaviors in the context of upstream and downstream processes and the flexibility necessary to meet each new customer’s needs and reduce variability in the output. But robust employees are also historically more difficult to find and more expensive to hire, train, and retain. During periods of high growth—particularly in industries with high labor needs and traditionally lower labor costs—in order to affordably scale the workforce, the service may require a shift in strategy toward standard work. This shift in strategy maintains quality of output but it is performed by employees that are less expensive to

Table 1. Types of service systems

Qualities of services more likely to require robust people	Qualities of services more likely to require robust processes
Personalized	Not variable from encounter to encounter
Performance driven (unique service outcomes with particular characteristics desired)	Conformance driven (repeatable process; customers want the same thing every time)
Complex; cannot be easily automated	Simple, easily repeatable process that can be automated
Early in the process lifecycle (e.g., a startup)	Late in the process lifecycle
Difficult to scale	Easy to scale
Heterogeneous customers with variable service demands	Homogeneous customers with identical needs

Table 2. Examples of services

Examples of services that require robust people	Examples of services that require robust processes
Five-star hotel	Budget hotel
Neurosurgery	Fitness app
Psychiatry/ counseling	Self-help book
University education	Technology learning platform
High-end department store or personal shopper	Brick-and-mortar or internet retail giant

hire and train. As a company grows, it is crucial for managers to understand and supervise the transition between the early investment in robust people and the later investment in robust processes that will enable future hiring to be less dependent on robust people. Ideally, a manager should clearly understand why, how, and when to leverage the best of both robust people and robust processes.

4. Robust people

Traditionally, human resources planning has subscribed to the theory that one can either hire for experience or for positive attitude and that one must make tradeoffs between the two, with the most expensive employees being those who have the right qualities in both categories. Hiring robust employees will require higher set-up costs but lower recurring operating costs as they require less training investment. The saying ‘Hire for attitude and train for skill’ represents a strategy that some companies, including Southwest Airlines, have put in place, whereby less-experienced (and therefore less-expensive) employees are hired but only if their attributes indicate that they can be trained to meet the role. The company then invests in training programs to coach these less-costly employees on content or skill sets that may be lacking. When coupled with ongoing engagement and retention programs, this strategy can enable a firm to escape the tradeoffs among experience, attitude, and compensation as they are traditionally understood, providing an enduring source of shareholder value.

One good example is a contrast between United Airlines and Southwest Airlines in their respective approaches to hiring and training flight attendants and security personnel. Both sets of employees are presumably able to perform their basic job function, but only one could be considered robust. United depends on manuals for employee decision making while Southwest does not. In fact, Southwest CEO Herb Kelleher advised burning all nonsafety manuals because he believed they prevent people from making the best decisions. Training flight attendants to be robust (using techniques sometimes called verbal judo) is a difficult task because there are so often

only a few levers available to defuse or resolve a situation (Lieber, 2017). In April 2017, when a United flight was close to departure, airline employees determined that four paying passengers should vacate their seats to accommodate four United employees. After requests for passengers to vacate the plane voluntarily failed, security began directing individual passengers to leave. One man who was asked to leave the plane identified himself as a doctor and explained he must make the flight because he had patients to see in the morning. As security guards forcibly removed the doctor from the plane, fellow passengers captured the events on video and the clip went viral, causing a public relations disaster and requiring United to rethink its training practices (Victor & Stevens, 2017). Although United’s CEO denied that the staff involved were following protocol, a more robust workforce would have viewed the passenger’s needs and the flight staff’s needs differently and would most certainly have been able to prioritize the doctor’s request to return home to his patients.

Robustness in an employee implies specific qualities that can be viewed collectively as a meta-awareness of how the individual interfaces with the system and how the system interfaces with the environment. (Table 3 lists qualities of the robust person.) Where do these robust qualities come from? And, more importantly, can they be taught and learned? The U.S. military believes it can teach robustness and conducts resilience training for its personnel that, among other outcomes, is thought to prevent suicide. Some believe that these traits can be innate but can also be trained and inspired. Others believe that these qualities are developed early in life and are difficult to fully realize if attempted to be cultivated later on. Most approaches to teaching robust skill sets involve alternating between experience and education. For example, when learning a new surgical technique, a doctor with decades of education is often asked to “see one, do one, teach one” (Kotsis & Ching, 2013).

5. Robust processes

There are important strategic concerns when investing in robust processes. Controlling or reducing the

Table 3. Qualities of the robust person

Personal Quality	Effect on the System’s Robustness
The ability to understand the effects of one’s actions in the local context, as part of a set of processes both upstream and downstream.	This person is more likely to recognize variability in the input that may lead to variability in output and to correct for it midstream.
The ability to understand the effects of one’s actions in the broader system view, as part of a business system with an overall goal (e.g., making a product or performing a service for a profit).	This person may be more likely to identify potential sources of variability or shock before they occur. This person is also more likely to be able to devise a plan B if the usual method for managing variability is unavailable.
The ability to understand complex situations with more than one competing priority and more than one corresponding course of action.	This person is more likely to be able to grasp the implications of and to correctly prioritize different courses of action—and select the course of action that will result in the least output variability.
The ability to think clearly during times of stress, such as during a crisis or when challenged by another person (such as an irate customer or difficult colleague).	This person is less likely to be reactive and more likely to know what to do when it is not in the manual, reducing output variability and unintended consequences. Mike Tyson called this grace under pressure, and said, “Everyone has a plan until they get punched in the mouth” (Berardino, 2012).
An awareness of potential fluctuations in one’s own output and the impact this may have on others.	This person (or supplier) is more likely to anticipate future variability they themselves create and preemptively communicate with the people who depend on them, thereby giving others time to adjust for this variability in advance and reducing the output variability of the total system.
The ability to stay focused on the positive and keep working toward a solution, even when times are tough (perseverance).	This person is more likely to continue to strive toward resolution of an extended period of difficulty (e.g., a natural disaster or slump in the market) without giving up or leaving, and contributing to an overall decrease in output variability.
A sense of one’s own limits with regard to any of the above traits and the ability to identify those gaps when they are needed and not there.	This person is more likely to be aware of the need to access additional resources, either internal or external to the firm, to help address a gap in the above and therefore reduce the likelihood of output variability.

effects of output variability can represent significant investment and effort. The best approach is to consider the robustness of the processes that deliver the product or service in the design phase. But even with good design, robustness must be a continual goal because the environment and competition are always changing and thus the potential sources of variability also evolve. Generally speaking, the potential dollar cost of output variation is multiplied by the potential likelihood of the variation—and the larger this number, the greater the investment that should be made to prevent it.

A process can be made more robust either by putting in place checkpoints to prevent error or controls that reduce variability. These checkpoints can be placed either in the input, the process, or the output. Robust design can also mean incorporating clever ways to make output variation irrelevant.

One of the most common practices for improving the robustness of a process is the *poka-yoke*—a Japanese term for mistake proofing—to prevent human error. One example of a *poka-yoke* is

requiring a driver to depress an automobile brake while pressing the ignition button, which eliminates most unintentional activations of an engine. A *poka-yoke* can be applied to the input of a process, the process itself, or the output of a process (see Table 4).

6. Moving from robust people to robust processes

We believe that integration with one’s environment is the key to any approach to building robust people and should incorporate the codevelopment of robust processes, mostly because it is the people who are part of a system who will inspire the most ingenious of solutions. These solutions can be captured in new standard work routines and incorporated into the system, making it more robust. Standardizing these new units of robust work and training employees in their application can increase other employees’ robustness. Empowered

Table 4. Qualities of robust processes

Process Attribute	Effect on the System's Robustness
Pauses at key points until a safety or security mechanism is in place.	Limits exposure of the service system to detrimental effects of safety or security errors potentially caused by an operator. For example, financial institutions require multiple forms of authentication to ensure that the account holder is on the phone.
Simple and repeatable.	Simple, repeatable tasks are easier to train and perform at scale without the operator applying their judgment to the situation, evaluating and sequencing multiple competing priorities, or customizing solutions. This limits reliance on robust people and allows for robust processes—or human mental autopilot—to take over.
Contains well-defined subprocesses or process units, also called standard work.	Simple, repeatable, fully specified processes—if designed correctly—account for important causes of variation.
Uses visual management tools to support operators' system/process awareness.	Kanban cards, data displays, floor markings, and shadow boards are all tools to make process and performance metrics more visible to operators. To the extent that they are used, they support robust processes and reduce the need to rely on robust people.
Contains unique, context-specific solutions that reduce the relevancy (to the user) of any unavoidable output variability.	This can include managing customer expectations, getting them to accept and even assign value to output variability. This can be accomplished through education and including the customer in the service process.

employees who have been exposed to a shared continuous process improvement (CPI) vocabulary are going to be more adaptable when unexpected inputs arise. This strategy, employee-driven CPI, is self-reinforcing and can become part of the culture of an organization (see [Figure 3](#)).

The dynamic illustrated in [Figure 3](#) represents an evolution of the service system from the upper left (Quadrant 1) of [Figure 2](#) (robust people with high external variability) to the lower right (Quadrant 4) of [Figure 2](#) (robust processes with low external variability). Through the CPI of engaging and empowering people, we reach the holy grail described by Dan FitzHenry in the epigraph: the development of robust processes so the firm does not need to spend as much time and money on hiring and training robust people for certain repeatable tasks.

7. Recommendations

When designing a robust service system, many types of variability must be considered, including expected variability caused by customers, service providers, or suppliers and unexpected variability caused by external events. This variability must be adjusted for within the service system to ensure consistent output that meets the customer's definition of quality. Robustness can be built into a service system in one of two ways: robust people or robust processes. Certain types of service systems might call more for robust people or robust processes,

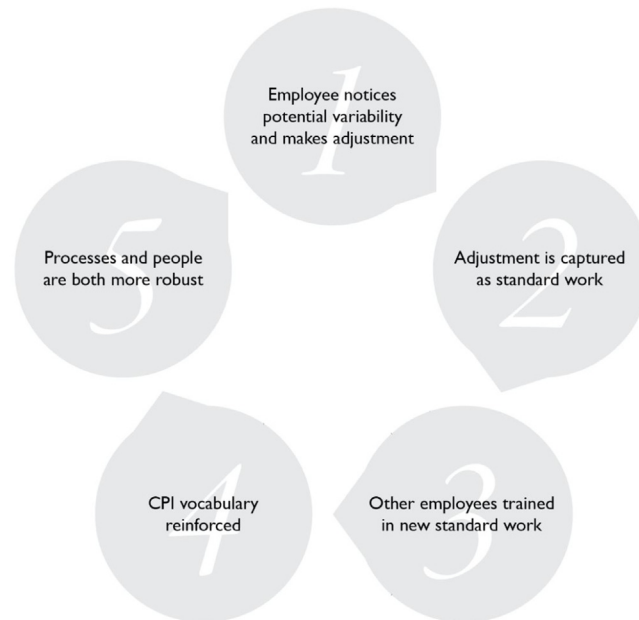
depending on certain qualities (e.g., whether or not the service is simple, repeatable, and the same for every encounter or complicated, not easily repeatable, and/or different for each encounter).

There are specific qualities of both robust people and robust processes that can be described—and, to some extent, taught or quantified—rendering the person aware of the effects of their actions and choices, both on the process upstream and downstream from them and on the output of the system from the customer's perspective. The robust person is generally able to prioritize multiple competing priorities, to react calmly under pressure, and to know who and when to ask for help. Robust processes, on the other hand, are defined by being easily repeatable, simple, and standard; by ensuring safety and security criteria are met; by incorporating visual management tools to enhance safety, reduce user error, and enhance understanding of the process; and by implementing creative ways to encourage customers to accept and even assign value to any output variability.

Robustness comes at a cost, and is among the many tradeoffs when designing a service system that produces a product or service. We advocate the following:

- When evaluating the relative merits of different investment options in either robust people or a robust process, consider the effects from the customer's point of view. What you do should align with their reasons for making the purchase,

Figure 3. The self-reinforcing cycle of robust people and robust processes



and how and why they wish to use the product or interact with the service.

- Become familiar with the strategies for making a process more robust.
- Become familiar with the traits of a robust person and how these competencies can be identified and further developed via interaction with your environment.
- Become familiar with techniques for managing your customer base to reduce the relevancy of variation in service system output.
- Consider the interplay between robust people and robust processes. People play an important role in identifying and building robust processes.
- Consider the lifecycle of the company. Early-stage companies are generally more dependent on robust people, while firms in a growth stage often shift to a reliance on robust process to keep variability to a minimum as output quantities escalate.
- Repetitive tasks are better left to machines, and one-off tasks that require sensitive judgment, multiple priorities, significant customization, and/or high levels of emotional satisfaction might always be better off with people.

The relationship between robust people and robust processes within a system can inform and build

upon one another in a cycle that mirrors that of continuous improvement. Investing in this cycle can help an organization move toward a system that relies more upon robust process and less upon hiring and training robust people, allowing the organization to be more easily scalable while simultaneously creating new opportunities for incumbent robust people.

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