Towards the brass ring: predicting recoverability

Introduction:

You, the preparedness professional, walk into an organization for the first time. You spend the day collecting data and interviewing staff. At the end of the day you deliver a single document. The document highlights a single number:

The organization's ability to recover from disaster within a 10 percent margin.

Predicting an organization's ability to recover from disaster ought to be of fundamental importance to the profession of recoverability planning, and to the leaders of any organization wishing to dedicate time, money, and effort to prepare for potential, adverse conditions.

Organizations need to know which preparation efforts will improve their odds of recovering. Stakeholders should know when preparations are adequate and when gaps exist.

It is clear that not only executives, but policymakers, the public, and "jurisdictions at every level across the country are asking 'What are we getting for our money?'"[1]

Grasping the brass ring of scientific predictability is years in coming. But our discipline can lay the foundation now.

What we need to get started is a model that synthesizes and reduces the complexity of preparedness to its critical essentials.

This paper presents such a model. It also points the way towards a fully realizable vision for measuring preparedness and predicting recoverability.

[1] Jensen, Jessica, Ph.D., "Preparedness: A Principled Approach to Return on Investment," International Association of Emergency Managers, August 11, 2011.

Section one: the proper scope

Before presenting a model, we need to establish exactly what it is that we are measuring.

One challenge of preparedness and recoverability discussions is that key terms in this industry are still somewhat unclear or inconsistently used. Terms such as resilience, continuity planning, sustainability, disaster recovery, survivability, risk management and others are often equated or conflated.

While a separate publication[2] offers a fuller presentation and defense of scope, in the interest of space and readability, here are five principles to establish the groundwork for our model:

1. Preparing for recoverability is not prevention. The focus of prevention is avoiding a loss; the focus of recoverability is recovering from a loss and efficiently returning to "new normal".

2. Recoverability is not survivability or resilience. These terms are both too nebulous and too broad reaching for the properly narrow scope required for our measurements.

3. Recoverability concerns recovery from a physical and/or staffing loss. We draw the focus away from the protection of an image or brand and direct it towards recovering from the loss of people, facilities, and/or resources.

4. Recoverability concerns the reestablishment of services, either individually or as an organic whole. This principle allows for the inclusion of any process, function, operation, or service that must be resumed to support the core mission of the unit, area, or organization.

5. Recovery is always a matter of degree. Recovery is not an all-or-nothing prospect; factors of time and degree must be incorporated into measuring the recoverability of services.

Based on the principles established in this section, a definition and proper scope of recoverability can be formulated as such:

> **Recoverability: The ability to recover services, individually and/or holistically, within the targets of time and degree following a physical and/or staffing loss.**

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[2] Lindstedt, David, "Measuring Preparedness and Predicting Recoverability," 2012. http://www.readinessanalytics.com/Measuring%20Preparedness%20and%20Predicting%20Recoverability_V1_r3.pdf

Having laid the foundation for the model with these five principles and a definition, let us turn to the larger question: What are the factors that determine recoverability?

Section two: the factors of recoverability

Naturally, there are many factors that come into play when considering the ability of a unit or organization to recover from a disaster. This, in part, explains the wide variety of planning standards, best practice guides, and maturity measures across the discipline of business continuity and risk management. Nonetheless, it is possible to synthesize and categorize the variables that factor into recoverability.

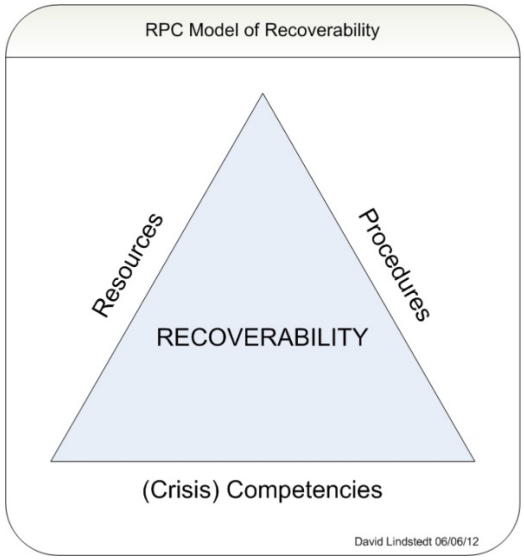
After a disaster, a unit or organization must rely upon the following to recover (some portion of) its operations:

- **Resources**: Physical assets required to provide services[3]
- **Procedures**: Methods, practices, and instructions for taking action to recover services[4]
- **Competencies**: Characteristics allowing individuals to function throughout recovery.[5]

One might think of this as the "what," the "how," and the "way" a unit can continue services.

Thus, a high-level model looks like this:

[3] ISO 22301 definition of resources: "all assets, people, skills, information, technology (including plant and equipment), premises, and supplies and information (whether electronic or not) that an organization has to have available to use, when needed, in order to operate and meet its objective", 2012, Section 3.47.
[4] ISO 22301 definition of procedure: "specified way to carry out an activity or a process", 2012, Section 3.39.
[5] ISO 22301 definition of competence: "ability to apply knowledge and skills to achieve intended results", 2012, Section 3.9.



By way of example, consider the following brief scenarios:

- A small manufacturing company is without power for many days. While they know how [procedures] they would restore each of their production lines, with leaders ready to take charge [competencies] and workers trained for tasks [competencies], there is no other manufacturing equipment available [resources], and they are forced to suspend production.
- A training department loses their building. For the first several days, they suspend all classes. But within two weeks, they collaborate [competencies] to identify and obtain teaching space [resources], figure out [competencies] how to make do [procedures] without the usual materials, and resume most classroom instruction.
- A data center is destroyed by fire, but they have experienced staff [competencies] to utilize a host of practiced procedures [procedures] to restore services within one hour at a fully redundant hot site [resources].

Any identifiable factor of recoverability fits somewhere within one of the three RPC categories. But what types of items fit within each of these factors? What are the further levels of categorization?

With regard to resources, these will be whatever the unit needs at-hand at time of disaster to provide services and aid in recovery. The list of specific, required resources will vary widely depending on the unit, ranging from pencils and paper to plastics injectors and NMRIs. This is the “what” is needed to recover. A high-level categorization for resources might be as follows:

- Equipment (including workstations)
- Hardware (especially if recovering IT)

- Software / Applications
- Space / Locations (including HVAC, network access, telecom access, proper security, and utilities)
- Staffing[6]
- Supplies
- Vital Records (including contact information, documents, and spreadsheets)[7]

With regard to procedures, this is "how" the unit will recover. Naturally, the specific procedures needed to recover will vary widely depending on the unit. This is particularly so when it comes to restoring specific services. There are a variety of ways these specific procedures might be categorized. Yet, a categorization of these procedures is possible by: analyzing typical activities in the hours following an incident, synthesizing existing industry standards and best practices, and acknowledging the uniqueness of specific service recovery and continuity procedures. The following categorization can classify the many different types of possible procedures:

- Assess
- Communicate
- Coordinate
- Establish locations
- Mobilize
- Prioritize
- Reestablish services

Finally, competencies are the "way" in which the unit will recover. This factor often gets overlooked in preparedness planning but is vitally important. A unit or organization that does not have the proper experience, performance, crisis exposure, preparedness planning, leadership, and training is going to be far less prepared to recover regardless of the resources and procedures that might be in place. In fact, some writers in the profession have even argued that competencies are the only important factors in preparedness and recoverability.[8]

Arguably one of the best studies on organizational readiness is Paul C. Light's "Predicting Organizational Crisis Readiness: Perspectives and Practices toward a

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[6] It is important to note that staffing does NOT include what might be termed "human capital" such as education, training, knowledge, and skill sets; these must be categorized within procedures and competencies.

[7] The importance of capital cannot be underestimated. Yet, as this capital must be expended and transformed into actual resources at time of disaster, it ought not to be listed as a resource in itself.

[8] See, for example, Stagl, John, "DRII, ASIS, NFPA? They're all missing the point," *Continuity Insights*, Vol. 6, No. 5, p. 20.

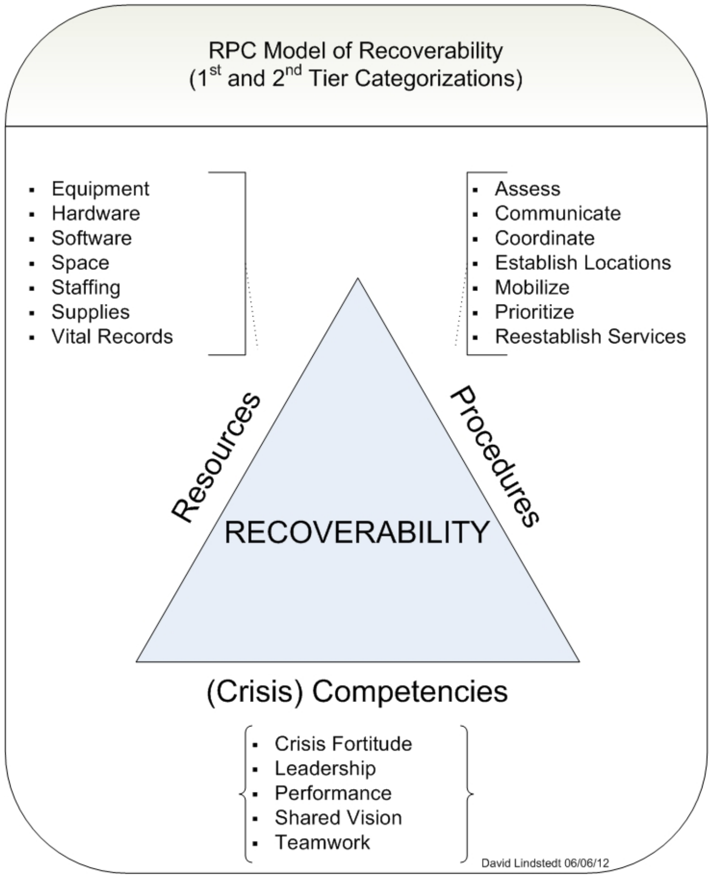
Pathway to Preparedness."[9] While Light's paper is devoted to "crisis readiness" *per se*, clearly his focus on preparedness is instructive to the topic at hand. Light proposes a categorization scheme for those characteristics of an organization that are likely to be statistically significant measures of crisis readiness.[10] He identifies 23 significant characteristics of preparedness including training, leadership, and high performing employees.

I have taken and synthesized Light's 23 significant predictors for competencies, making alterations that I hope will simplify the list and make it more intuitive. The ideal characteristics for those responding to an incident and recovering services are:

- Crisis fortitude
- Leadership
- Performance
- Shared vision
- Teamwork.

[9] Light, Paul C., "Predicting Organizational Crisis Readiness: Perspectives and Practices toward a Pathway to Preparedness," The Center for Catastrophe Preparedness and Response, New York University, Public Entity Risk Institute, year unknown.
[10] Light identifies a list of 23 significant "predictors of crisis readiness;" interestingly, he concludes that there are five predictors that are the most significant: high-performing, experience with external crises, shared vision of mission, preparedness planning, and preparedness training (p. 52).

Thus, the final model can be presented rather simply, with both the primary and secondary categorizations displayed, in the following diagram.



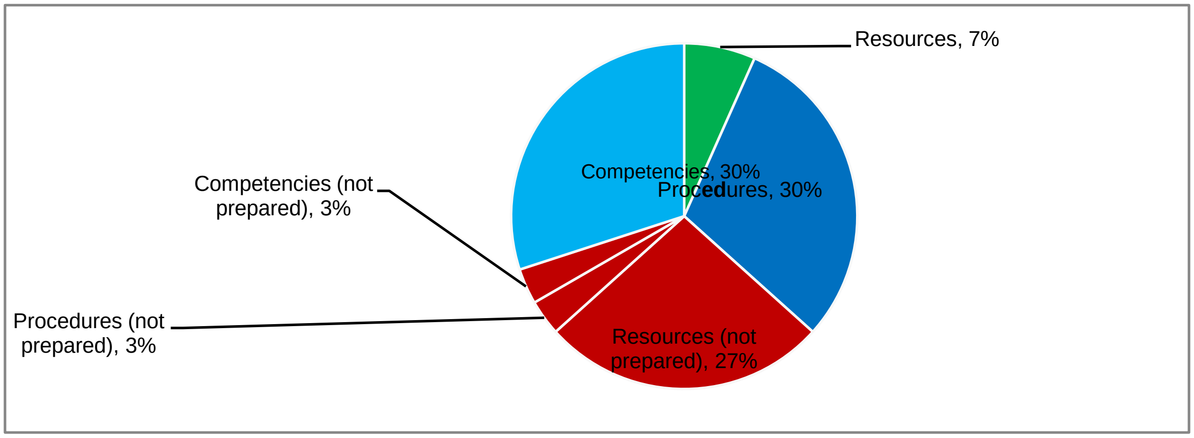
Section three: measuring preparedness

Measuring a unit's degree of preparedness seems simple in principle: identify the resources, procedures, and competencies (RPCs) that need to be in place then compare them to those RPCs that are actually in place. If a unit has 75 percent of everything it needs to recover, then it stands to reason that it is 75 percent prepared for recovery. Adding together and then averaging the RPCs for a unit provides a measure of preparedness that can be mathematically expressed as:

Recovery Preparedness = (R + P + C) / 3

Consider the manufacturing example from earlier where the organization had no alternate equipment available to them during an extended power outage. Before the disaster one might judge that they have only 20 percent of the resources they need (since they do not have another manufacturing site to use) but perhaps as high as 90 percent of the procedures and 90 percent of the competencies they require.

Looking to analyze this in terms of the whole, preparedness might be most easily visualized like this:



In this case, one might say they are 66.6 percent prepared, as (20 percent + 90 percent + 90 percent) / 3 = 66.6 percent.

While this approach seems simple enough, it presents an immediate problem: how can one account for differences in the degree and timeframe of what the unit wants to recover?

This question is difficult to answer in both theory and practice, but a proper approach can be determined.

The targets a unit sets for what and how quickly it will recover from a disaster are not necessarily the same as the current operation. A unit may plan on resuming only 50 percent of its current services and plan on taking a month to do so. Another unit may need to resume 90 percent of its operations within a matter of hours.

Hence, what it takes to be prepared to resume 50 percent of a unit's functionality in a month is likely going to be much less than what is needed to resume 90 percent of its operations within a matter of hours.[11] This provides further detail to the earlier principle that *recovery is always a matter of degree,* and leads to another principle of sorts:

(Recovery) preparedness must frame measurements within established recovery targets of degree and time.

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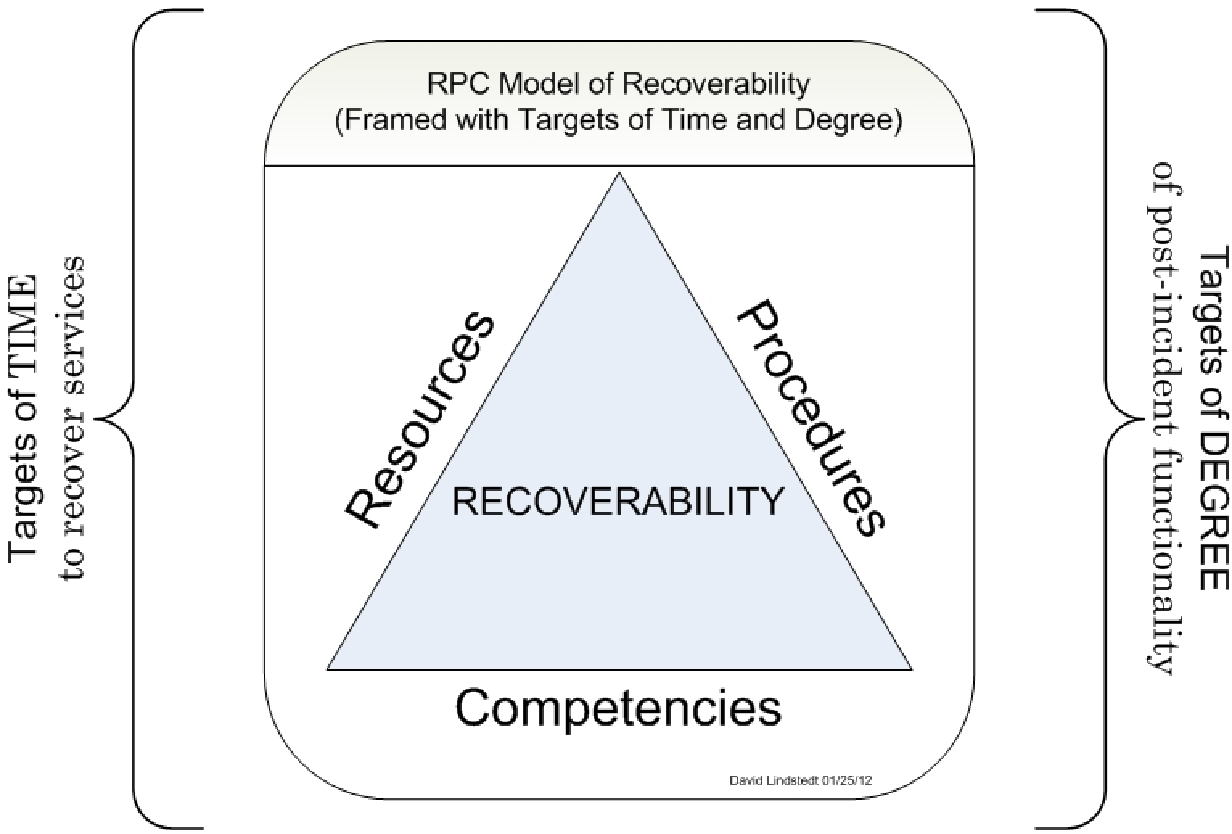
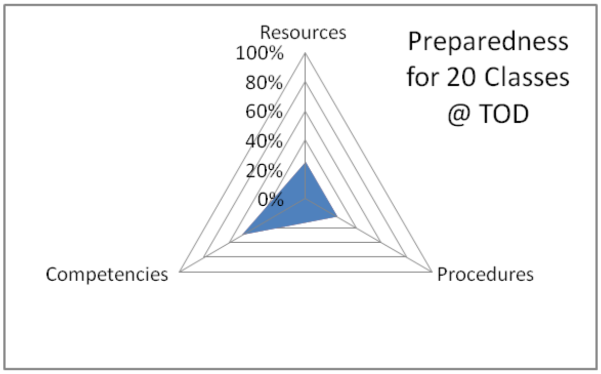
[11] As Brian A. Jackson succinctly puts it, "questions of speed, scope, and scale are critical…" Jackson, Brian A., "The Problem of Measuring Emergency Preparedness: The Need for Assessing 'Response Reliability' as part of Homeland Security Planning," Rand Corporation, 2008, p.4

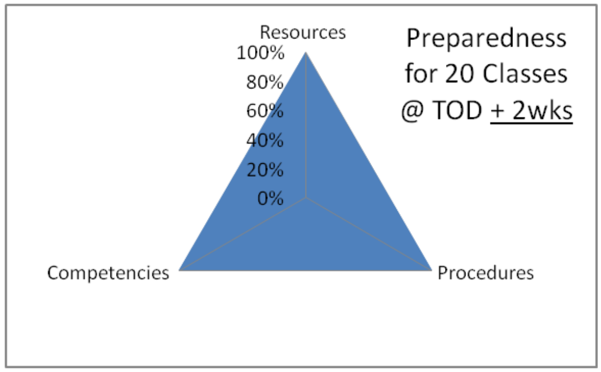
This concept might be depicted as follows:



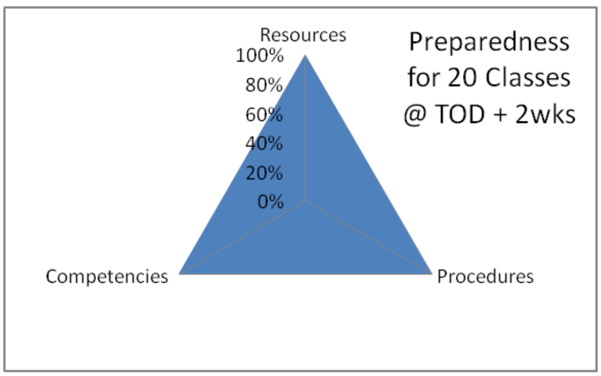
Thinking back to the example of the training department whose building was destroyed, the group was not able to recover classes right away; it took them two weeks before they could offer a majority of their classes. Suppose they recovered 20 of their 30 existing training classes within two weeks. One might say that they had only 25 percent of the resources (particularly classroom space), 25 percent of the procedures, and 50 percent of the competencies prepared to recover right away. Thus one might judge them to have been 33.3 percent prepared to recover 20 classes [measure of degree] at time of disaster [measure of time].

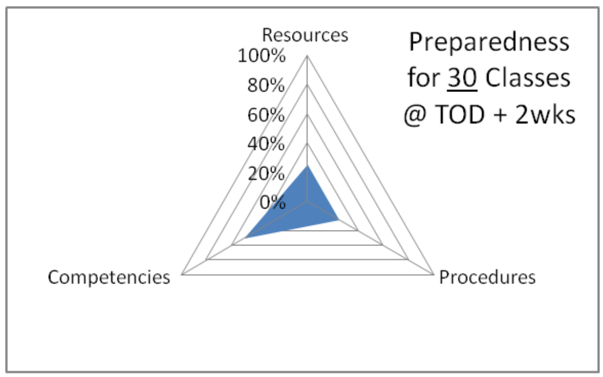
After a while, however, the instructional group was able to secure additional resources, create procedures, and build competencies to offer most of their classes. Thus, in two weeks [time], they might have 100 percent, 100 percent, and 100 percent of their RPCs respectively, and thus be 100 percent prepared to offer 20 classes [degree]. The measures might look like this:





Note that the measurement kept degree fixed and changed the point in time for the two measurements. This could have been reversed, fixing the time and asking the question, "How prepared are they to recover 20 classes in two weeks and also 30 classes in two weeks?" The resulting two measures might look like the following charts:





Alternately, the measurement could have changed both the degree and the time. Stakeholders may want to measure different degree and time targets for different types of scenarios.

The math is not meant to be imposing and can be used to a degree of precision that is appropriate to the organization. It would be rather easy to use this model to quickly summarize a unit's level of recovery preparedness: "We estimate the unit has about half of the resources, half of the procedures, and most of the competencies needed to recover 75 percent of our operations within a week." Yet these equations are robust enough to provide critical measures of preparedness at any level of detail.

It would certainly be possible to identify the critical services within an organization, estimate the preparedness for each service given its targeted recovery degree and timeframe, and calculate all measures together for a combined measure of preparedness.

A quick hotel example at a high level might look like:

Reservations	R =	25%
(manage all reservations	P =	25%
within 4 hours)	C =	65%
Catering	R =	75%
(boxed lunches only	P =	75%
within 24 hours)	C =	90%
Kitchen	R =	85%
(cold food only	P =	95%
within 24 hours)	C =	90%
Laundry	R =	50%
(turn 55 rooms	P =	50%
within 24 hours)	C =	75%

AP / AR	R =	80%
(resume all AP / AR funct.	P =	60%
within 72 hours)	C =	90%
Check In / Check Out	R =	25%
(manage all guests	P =	25%
within 4 hours)	C =	65%
Valet	R =	95%
(fully operational	P =	80%
within 2 weeks)	C =	80%
Total Estimated Preparedness		
within degree and time targets:		**67%**

Section four: the relationship between preparedness and recoverability

We are not preparing to prepare; we are preparing to *recover*. This is critical because it leads us to the final, consequential questions of the paper: what is the relationship between preparedness and recoverability, and, can we predict recoverability based on preparedness?

One might be tempted to equate preparedness and recoverability, thinking that if a unit is 75 percent prepared to recover (within the targeted frame of degree and time), they are 75 percent recoverable. Or, put another way, it seems logical to guess that a unit that is 75 percent prepared to recover has a 75 percent chance of recovering.

Surprisingly, this is not so.

The problem comes with the realization that each of the factors of recoverability *interact* with the other two. Resources, procedures, and competencies are not silos and do not function independently of each other.

This can most easily be seen in extreme cases. For example, suppose a unit knows how it will do everything to recover and has the most competent staff imaginable. Yet they lose everything in a fire and have no additional capital. So, they score a 0 percent for resources and 100 percent for procedures and competencies. They average out to 66.6 percent preparedness, as (0 percent + 100 percent + 100 percent) / 3 = 66.6 percent. But, judging ahead of time, one would have said that they have no chance to recover from a total physical loss.

The measure of preparedness must not be the same as the predictor of recoverability.

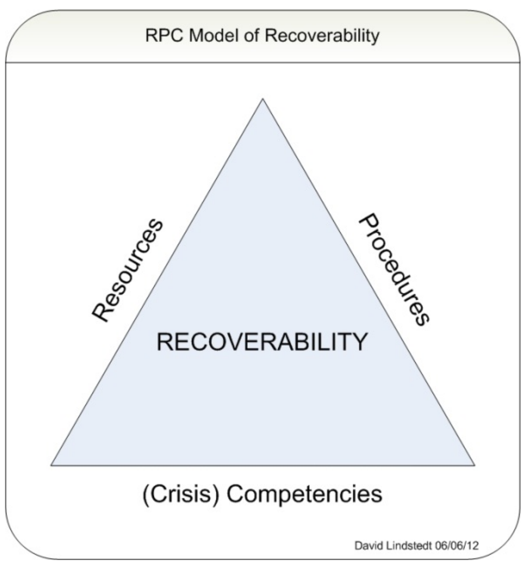
Take a subtler example of a unit that has prepared, say, 75 percent of the necessary RPCs. The RPCs in this case might not "match up" to one another. Some existing procedures might need equipment that is part of the 25 percent of missing resources. Or the existing procedures might play on training and past experience (competencies) that is lacking. Or the majority of resources might be ready to go, but no one knows how to use them (procedures) or the people are too emotionally affected by the disaster to be of any help (competencies). The what, how, and way that a unit needs to recover all influence each other.

This brings us to another principle:

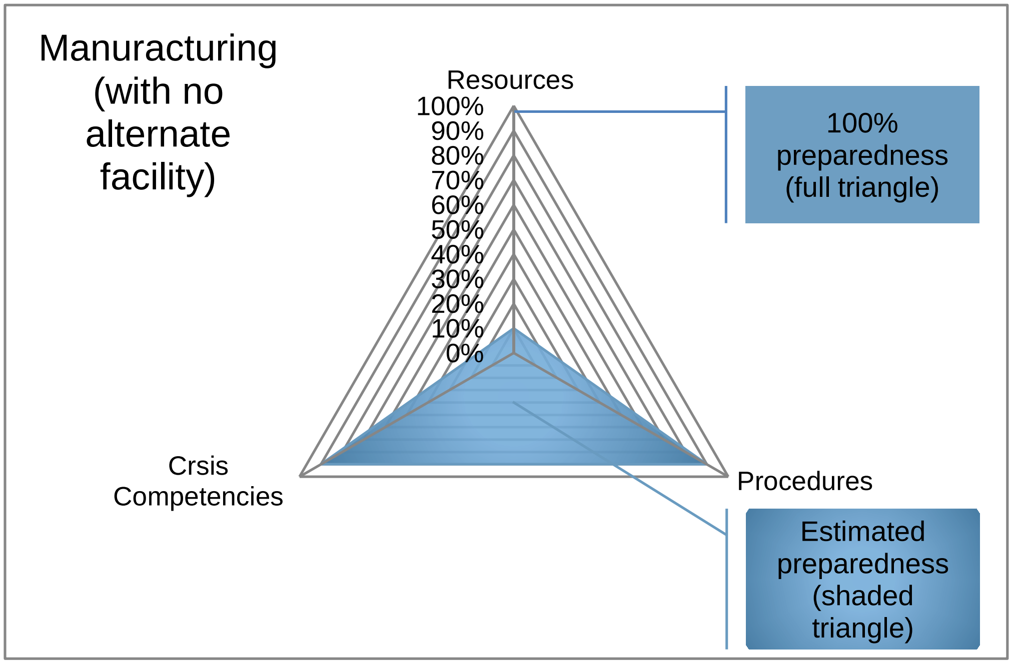
The factors of resources, procedures, and competencies influence one another.

But clearly there must be some relationship between (recovery) preparedness and recoverability? If there were not, then there would be no point in preparing to recover in the first place.

Perhaps the best way to visualize this is to return to our original model of recoverability:



Here is an extreme example, where only 10 percent of resources exist in comparison to 90 percent of both procedures and competencies. The area of recoverability might be depicted like this:



The area of recoverability is very small. Yet the measure of total preparedness is 63.3 percent. This small area of recoverability should match our intuition that a unit which has only 10 percent of the resources it needs to recover (including capital) is not likely to recover any time soon, if at all. We would predict that anything like full recoverability for this department is improbable.

Thus, at least the following deduction is possible:

A measure of preparedness does not equate to a prediction of recoverability.

It is important to note that such a prediction of recoverability is impossible without the measure of preparedness. Just because preparedness is not the same as recoverability does not mean that measuring preparedness becomes dispensable or inconsequential; it is essential to a prediction of recoverability.

Section five: predicting recoverability

Based on the model, can recoverability be predicted? With the type and amount of data currently available, a precise equation is impossible at this point in time. However, it is possible to propose a hypothesis for initial use and further study.

This paper proposes that there is a direct, influential relationship between the RPC factors. As an initial proposal, assume that each RPC factor influences each other with equal weight, which can then be expressed as such:

Recoverability = R x P x C

Imagine the theoretical case above where a unit has no resources (including capital) but all possible procedures and competencies. As noted, they average out to 66.6 percent preparedness yet one would have said that they have NO chance to recover from a total loss disaster. Instincts are right in this case, as the equation confirms that 0 percent x 100 percent x 100 percent = 0 percent. They had a 0 percent chance of recovering in this extreme case.

Thus, the equation reflects the fact that the percentages of missing RPC factors each interact with each other, such that missing factors in one category compound the missing factors in another. This can be stated as:

Each factor of recoverability (R, P, and C) multiplies those factors that are not available at the targeted time of recovery.

The equation indicates the multiplicative nature of the three factors, and that improving (or neglecting) any one factor will have an influence on the other two as well as recoverability as a whole. Available RPCs might not "match up" to one another. A critical resource needed as the dependency of a procedure may be unavailable. The what, how, and way that a unit needs to recover all influence each other. A simple dependency table might look like this.

Required Resource	Required Procedure	Required Competency	Outcome
✓	✓	✓	✓
✓	✓	X	X
X	✓	✓	X
✓	X	✓	X
✓	X	X	X
X	✓	X	X
X	X	✓	X

Section six: towards the brass ring

Naturally, however, the *Recoverability = R x P x C* equation will likely prove to be too simple. It seems almost certain that each factor has its own influence and level of importance involved in the outcome of recovery. It may turn out that resources and competencies are more critical than procedures; thus future study may provide an improved equation that properly expresses each factor's criticality on recoverability, such as: *1.7R x 0.7P x 1.2C*. Moreover, consider this at the second level of the RPC model of recoverability, where a proper predictor could weight each of the causative factors. In this case, each sub-competency, for example, should have its own weight, resulting in a weighting of culture, experience, external relations, internal structure, leadership, and training.

While this conceptual model of recoverability is a critical first step, it is important to note that there is still much work to be done to flesh it out properly. The model establishes a framework for discussion and make improvements; it does not mean the work will be easy. Jackson states it nicely: "The reason most current efforts focus on things that can be counted is because that counting is comparatively easy – and assessment that goes beyond such input measures will be more difficult almost by definition."[12]

Yet the work can indeed be done. Armed with a model, we can make predictions *before* disaster, and measure actual outcomes *after* actual disasters. Researchers can ask questions along the lines of:

- "Before the incident, you indicated that your helpdesk was 92 percent prepared to get up and running in six hours with five people in an off-site location; to what degree did you accomplish that goal?"
- "Before the incident, you indicated that your centralized payroll system was 87 percent prepared to be up and running within four hours with full functionality and no loss of data; to what degree did you accomplish that goal?"

Professionals can compare the before and after measurements to refine predictions and determine the correct influences of each of the three factors. In short: Preparedness professionals need to make it part of their normal duties to measure preparedness before a disaster and compare it to actual recoverability following a disaster.

The formula Recoverability = R x P x C is a working hypothesis in the truest sense of the term. It should serve as a starting point against which to predict recoverability and measure actual results.

[12] Jackson, *ibid*, p. 21.

But is should serve as a starting point. Practitioners and researchers should begin the work to move towards the brass ring of the profession.

Future efforts along these lines may allow us one day to accurately predict an organization's ability to recover from disaster. Then perhaps we all could consciously and more wisely prepare our communities to face the unexpected.

About the author:

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He has used the RPC Model of Organizational Recoverability to measure preparedness and calculate a Recoverability Confidence Index™ for different organizations in different industries around the world.

Dr. Lindstedt has presented at numerous conferences and has published several articles in international journals.

He has taught continuity planning for Norwich University and currently serves on the editorial board for the *Journal of Business Continuity and Emergency Management.*

He is also the founder of Readiness Analytics, LLC.

About this article:

This article is based on Lindstedt's white paper entitled: 'Measuring Preparedness and Predicting Recoverability." The original paper is published under an "Attribution-NonCommercial-ShareAlike" creative commons license. It can be found in its entirety here:
http://www.readinessanalytics.com/Measuring%20Preparedness%20and%20Predicting%20Recoverability_V1_r3.pdf