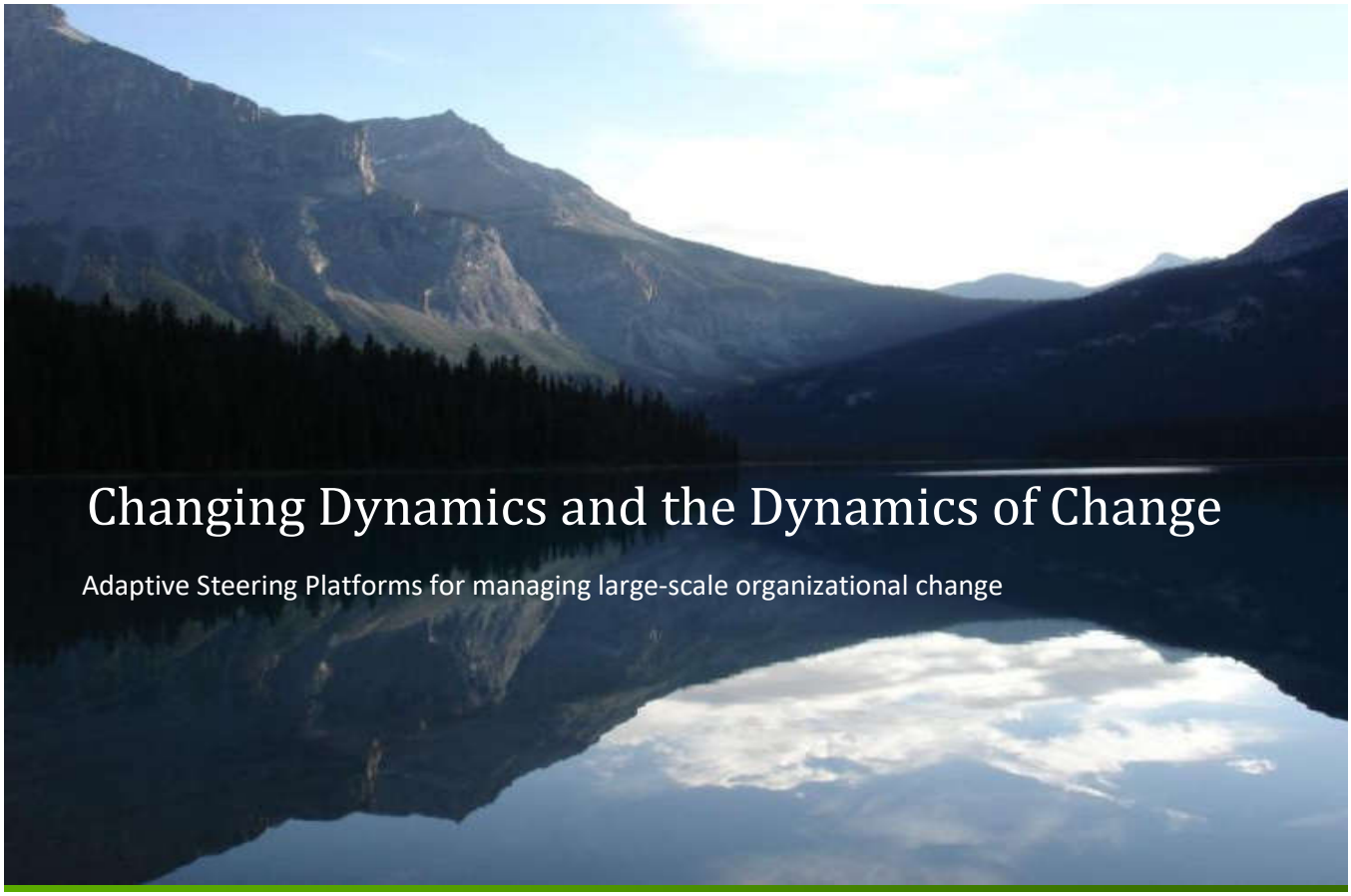

Changing Dynamics and the Dynamics of Change

Adaptive Steering Platforms for managing large-scale organizational change

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Introduction

Large-scale organizational change efforts usually aim at improving organizational performance. Altering performance usually means that we must alter the organization's dynamics, the feedback mechanisms that drive that performance. Hence the first half of the title of this paper, "Changing Dynamics".

Implementing a large-scale organizational change usually involves making a large number of smaller, component changes in an organization that continues to operate during those changes. Those changes are too numerous to be made simultaneously and must therefore be made at least partly in series. Each such change alters the organization and its performance in various ways and degrees, for better or worse or both at different times. In other words, successive changes are applied to a constantly shifting organizational base with constantly shifting performance. Effective change implementation takes this evolution into account. Hence the second half of the title of this paper, "the Dynamics of Change."

This paper first addresses challenges inherent in all large-scale organizational change efforts. It then shows how those challenges are rooted in the underlying dynamics of the organization that must be changed to improve performance. It explains why traditional analysis methods shed little light on the performance results to be expected from organizational change, illustrates resulting problems and shows what can be done to avoid or resolve those problems.

Key points in this paper are illustrated by reference to case examples involving various large organizations (with identities disguised): a leading credit card firm (Creditcard); a major urban-transit system (Subway); a top aerospace manufacturer (Aerospace); and a leading telephony technology company (TelTech). This and a great deal of similar work has yielded empirically observed principles regarding changing dynamics and the dynamics of change which are included at appropriate points in the paper. Discussions of the cases themselves are in italics, including the brief introductions that follow.

- *In the early 1990s Creditcard had been losing market share in North America for nearly a decade. Multiple solutions had been implemented with no apparent effect on the downward trend, and observers speculated that the brand was becoming unsustainable. A major and controversial change (co-branding of credit cards) sharply reversed the share losses, generated dramatic profit increases, and revolutionized the credit card industry.*
- *Subway is one of the world's largest metro systems, carrying millions of passengers daily. Despite being integral to the economic health and growth of one of the world's largest cities, Subway suffered for many decades from insufficient government funding and declining performance. A new government moved to end the underinvestment while simultaneously reducing Subway's dependence on public financing. This required a major organizational change.*

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- *Aerospace developed two different types of advanced combat aircraft in separate programs. Part-way through the Engineering phase of each development program, their government customer ordered Aerospace to carry out a large-scale organizational change from a functionally-based organization structure to Integrated Product Development Teams. In sharp contrast with industry experience and accepted wisdom, Aerospace's enlightened design and implementation of these changes reduced cost and accelerated completion on both programs.*
- *TelTech had been experiencing substantial cost, schedule and quality problems on projects to develop new versions of their advanced telephony software systems. They made major changes to their product-development processes to avoid such problems in the future, and were then surprised by sharply unexpected performance from the next product-development effort.*

Three challenges of large-scale organizational change

Challenge #1: The combinatorial explosion. The world of large organizations seems to move faster today and to involve more uncertainties, many of them from new and unprecedented sources. To survive and perform well in the face of such environmental and operational uncertainties, organizations find themselves changing what they do, how they do it, and how they are organized to do it. Ideally they define and design these change programs based on a through understanding of the multidimensional uncertainties they face (both individually and in combinations) and their performance consequences.

Management also faces many alternative ways to define and implement organizational change. Ideally, they define and design change programs based on a thorough understanding of these change options (both individually and in combinations) and their performance consequences.

When management's multiple change options are overlaid on multidimensional environmental uncertainties, the result is a "combinatorial explosion" – an overwhelmingly large number of possible option-uncertainty combinations to be considered in designing and implementing organizational change. This combinatorial explosion dwarfs the capacities of all traditional analysis methods, the limitations of which ensure that only a tiny fraction of all change options can be examined in light of only a tiny fraction of uncertainties. This virtually guarantees that the vast majority of potentially attractive options will remain unexamined, along with the vast majority of potentially dangerous options and uncertainties. Consequently change design and implementation are almost certain to fall short of what could be achieved and change-program failure becomes much more likely.

Challenge #2: How do we know it worked? Large-scale organizational change is, by nature, complex, time-consuming, distracting, disruptive, and expensive. Some large change efforts visibly fail to deliver targeted performance improvements. For many more change efforts it is difficult to say in retrospect whether the changed organization performs better than it would have without the change.

That last point is telling, and from it flows a first set of empirically observed principles related to large-scale organizational change.

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#1a: Traditional analysis methods usually cannot tell us reliably how the pre-change organization would have performed. Hence they cannot tell us whether or to what extent an organizational change has improved performance.

#1b: If traditional analysis methods cannot tell us whether a change improved performance even after the fact, then they also cannot tell us reliably whether a proposed change will improve future performance, or how it will do so, or by how much.

#1c: As a result, most large-scale organizational changes are defined and implemented based at least as much on educated management guess-work as on rigorous analysis-based design.

These principles result from the underlying performance-driving dynamics of all large organizations, the feedback mechanisms that are primary determinants of the success and failure of large-scale organizational changes. These dynamics are discussed in the next section of this paper.

Challenge #3: The tip of the iceberg and the rest. By practical necessity change programs focus on organizational elements that can be seen and perceptibly altered. Almost by definition change programs cannot focus on organizational elements that are not readily perceptible. Yet, like an iceberg, most of the organization's mass lies below the surface where it is much less perceptible and therefore less susceptible to intentional change. Those hard-to-perceive organizational elements exert a powerful and largely unrecognized influence on large-scale organizational change efforts.

Being less readily perceptible does not mean that those elements remain unaffected by large-scale organizational change. It means instead that organizational-change influences on those elements are relatively unconscious and unmanaged, are less likely to be made in ways that will benefit performance, and are more likely to produce unanticipated and (usually) undesirable consequences. Most of the organization's performance-driving dynamics are to be found among these less-perceptible elements.

The underlying dynamic reality of complex organizations

A network of feedback mechanisms drives performance in every large organization. These mechanisms connect: 1) component elements of the organization with each other; 2) the organization with its employees and other stakeholders; 3) the organization with its markets and competitors (themselves driven by their own feedback networks); and 4) the organization with its broader economic, regulatory and market environment. This network of feedback mechanisms constitutes the underlying, performance-driving dynamics of the organization.

In general, organizational change aims to improve performance by altering perceptible internal boundaries and processes. To succeed in changing organizational performance, those alterations must bring about changes in the strength and timing of the feedback mechanisms that are driving performance. Without changes in the organization's performance-driving dynamics, substantial changes in performance are unlikely.

Here enters a complicating factor: How can we know which perceptible organizational boundaries and processes to change to improve performance? In other words, which

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boundaries and processes are most closely tied to the key feedback mechanisms driving performance? This complication leads to a second set of empirical principles regarding organizational change:

#2a: A complex organization embodies hundreds of processes, many of which will be plausible candidates for organizational change. To cite one example, one large telecommunications firm identified over 80 high-level "critical processes", most of which included many component sub-processes.

#2b: Despite appearances, and contrary to popular belief, most processes that are plausible candidates for organizational change are not strongly connected to key performance-driving feedback mechanisms. Changing processes that weakly influence organizational performance usually does little to improve performance.

#2c: No traditional analysis method can differentiate between the vast majority of processes that are not strongly connected to key driving feedback mechanisms and the small fraction that are.

#2d: Consequently most large-scale organizational change efforts devote substantial energy, often the majority of their energy, to changes that will produce little or no improvement in organizational performance and may even damage it.

This rather grim picture does much to explain why so many organizational change efforts fail to deliver improved performance. On a more positive note, it also suggests that organizational change efforts can deliver greater performance improvement with lower risk, effort, cost and disruption by focusing on processes and associated feedback mechanisms that are key performance drivers. This requires an ability to reliably analyze how various feedback mechanisms are driving performance and how organizational changes would alter the strength and timing of those feedback mechanisms – a capability that traditional analysis methods lack.

Experienced Creditcard managers had previously implemented many plausible "solutions" to their share-loss problem. Two factors explain why those all failed: 1) the "solutions" either did not address highly leveraged feedback mechanisms or they were defeated by unrecognized offsetting feedback mechanisms; and 2) none of Creditcard's traditional analysis methods could reliably test proposed solutions in advance. These factors resulted in a huge waste of organizational energy over a long period when Creditcard could ill afford continued share loss.

Choice of approach makes a big difference

Why traditional analyses aren't enough. Simply stated, traditional analysis methods cannot represent the feedback mechanisms that drive organizational performance. Instead they offer static, linear, feedback-free representations of highly non-linear, feedback-intensive real-world organizational dynamics. This limitation makes traditional tools nearly useless for the critical task of determining how changes and uncertainties will affect the most important performance-driving feedback mechanisms.

To be more specific, traditional analysis methods cut off feedback mechanisms and substitute assumed numerical inputs. Because hundreds of feedback mechanisms operate in any complex organization, substituting numerical inputs makes traditional analyses very data-intensive and

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hence labor-intensive and slow. It also damages their predictive reliability because it is impossible to maintain internal consistency among so many numerical inputs over the analysis periods needed to design and meaningfully assess large-scale organizational change. Furthermore, the slow speed and labor-intensity of traditional methods makes it impossible to analyze more than a tiny fraction of the combinatorial explosion of possibilities resulting from multiple change options and multidimensional associated uncertainties. This further contributes to poor predictive reliability by leaving unanalyzed many important uncertainty scenarios.

It should be noted that traditional methods are necessary for many purposes including analyses related to organizational change. But the primacy of performance-driving feedback mechanisms and the inherent limitations of traditional tools make the latter quite insufficient for comprehensive, reliable analyses of organizational performance and change.

Adaptive Steering Platforms avoid these limitations. Adaptive Steering Platforms (ASPs) enhance change-related decision-making by avoiding the limitations inherent in traditional approaches. An ASP employs Dynamic Simulation technology that originated at the Massachusetts Institute of Technology for simulation-based analysis and understanding of feedback-intensive systems including complex organizations. The underlying technology has a long track record and is thoroughly proven. Greenwood coined the term Adaptive Steering Platform to explicitly characterize the organizational value derived from that capability, which yields improved organizational performance and simultaneously reduced risk. These platforms facilitate the dialogue between strategic and operational decision-makers and promote integrated performance-enhancing solutions.

An ASP re-creates an organization's real-world feedback mechanisms in validated, computerized form. Being able to reliably represent feedback mechanisms dramatically reduces the number of required numerical inputs, greatly increasing both the speed and the predictive reliability of performance analyses. ASPs can be validated to much more stringent standards than can traditional analysis methods, which sharply increases predictive reliability relative to traditional tools. The high speed of an ASP allows evaluation of many more organizational change scenarios, which reduces uncertainty and further increases predictive reliability and the likelihood of significant performance improvements.

An ASP is first the platform for determining (with high confidence) how the pre-change organization is likely to perform under a wide range of scenarios. Then that platform is used to systematically design: 1) a new organizational "end-state" that will yield demonstrably superior performance under those scenarios; and 2) a robust change-implementation path to that new end-state. Because it mirrors the organization's performance-driving dynamics, the Steering Platform reliably adapts to an extremely wide range of change-option/uncertainty combinations.

It should be noted that ASPs do not replace traditional analysis methods. Indeed, an ASP could not be set up or validated without the information available from traditional analysis tools. But because they are free of traditional methods' limitations where feedback mechanisms are involved, Adaptive Steering Platforms greatly extend the range and reliability of analytical results regarding organizational performance and the changes needed to improve it.

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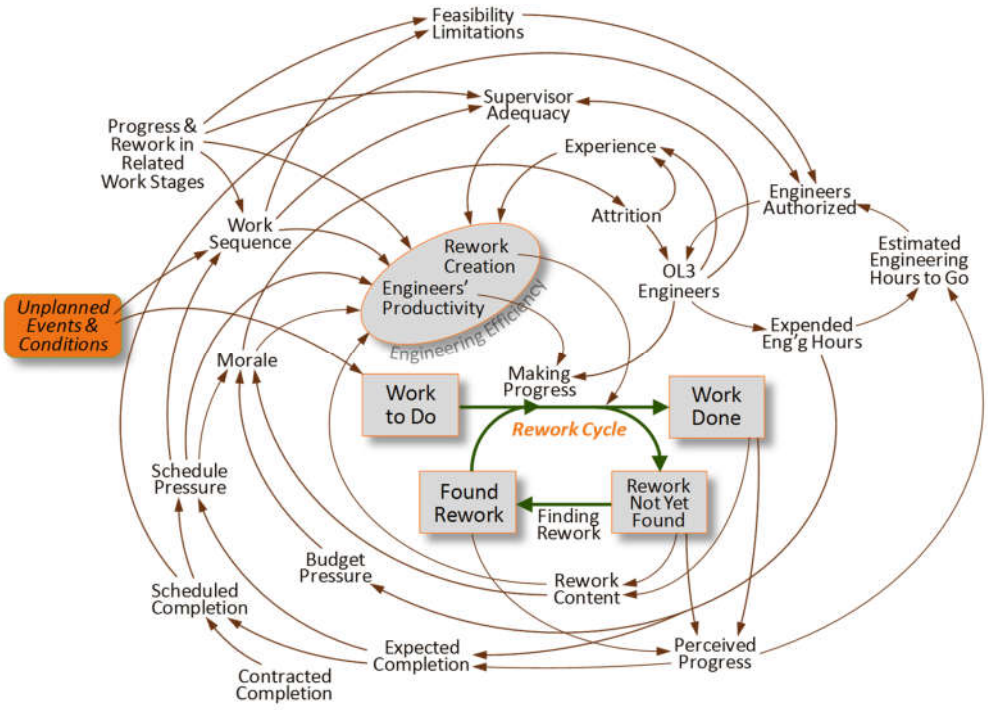
Dynamic definition of large-scale organizational changes

The ability to reliably simulate performance-driving organizational dynamics (embodied in the ASP) supports a new dynamically based approach to defining organizational changes. The ASP serves as an independent test bed for various organizational change options. Setup of the ASP starts with identifying key aspects of organizational performance to be improved and the factors that dynamically influence them. Those factors are integrated in an influence diagram showing the key feedback mechanisms that drive those aspects of performance. The diagram constitutes a qualitatively expressed scientific hypothesis regarding the dynamic drivers of organizational performance. That hypothesis is tested and refined (qualitatively at this stage) based on any inconsistencies with recent organizational performance or lack of explanatory power regarding the underlying causes of recent performance.

An example of such a diagram is shown below. It portrays the dynamics (feedback mechanisms) driving engineering performance on complex development projects like those described in the Aerospace and TelTech cases in this paper.



Even at this qualitative stage, diagrammed organizational dynamics have analytical power. They can be used to begin examining candidate organizational changes, determining which feedback mechanisms are likely to be altered in strength and timing by those changes. Then the implications of those alterations for organizational performance can be qualitatively evaluated. Such evaluations cannot be relied on for quantitative results or for fine distinctions between candidate organizational changes. But they often help with early identification of candidate changes that are likely to prove dangerous or ineffective, a valuable contribution in the formative stages of a large-scale organizational change.

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Very early on, CreditCard's diagrammed dynamics revealed that management policies being implemented for different purposes in two different parts of the organization were likely to produce conflicting consequences in a third part of the organization.

Subway asked for organizational-change assistance just six weeks before they had to advise the Government regarding initial down-selection from among nine candidate restructuring options. A full ASP could not be set up so quickly, but the candidate changes were evaluated qualitatively by tracing their likely impacts through Subway's dynamics, diagrammed in the first few weeks of ASP work. This qualitative review led to early elimination of four otherwise-plausible candidates that were (for dynamic reasons) likely to endanger Subway's long-term health and performance. Traditional assessments had not revealed the danger.

In the second round of dynamic hypothesis testing, the diagrammed feedback mechanisms are converted into a quantitative computer simulator mirroring the organization's real-world dynamics. This dynamic simulator, the core of the Steering Platform, constitutes an explicitly stated hypothesis regarding organizational performance and the dynamics driving it. That hypothesis is tested and refined based on the simulator's ability to independently re-create the organization's known historical performance. Iterative refinement progressively reveals the strength and timing characteristics of the performance-driving feedback mechanisms, most of which are quite stable over time. This is a much more stringent validation process than can be employed with traditional static analysis tools, and it yields considerably higher levels of confidence and predictive reliability.

Once validated, the ASP is ready for quantitative analytical use in designing organizational change. At that point the Steering Platform will typically exhibit reliability of +/- 5% both in retrospective re-creations of organizational history and in forward-looking scenario-based simulations of future organizational performance. That does not make the ASP a forecasting "crystal ball" – but it is capable of simulating organizational performance under a very wide range of environmental and organizational scenarios with much higher reliability than can be obtained from traditional analysis methods.

An early step in the dynamically based design of organizational change is a systematic search for feedback mechanisms that have the greatest driving influence on organizational performance. This testing is based on additional empirically observed principles of organizational change.

- #3a : Even a very large change program usually alters the strength and timing of only a small fraction of an organization's performance-driving feedback mechanisms.
- #3b: Performance in feedback-driven organizations is disproportionately insensitive to the vast majority of the organization's feedback mechanisms and disproportionately sensitive to the small remaining fraction (typically 3-5%) of those mechanisms.
- #3c: The highly leveraged feedback mechanisms are rarely found where experience or executive judgment would suggest – the only reliable way to identify them is through systematic testing with a validated Adaptive Steering Platform.
- #3d: Knowing the strength and timing of the organization's performance-driving feedback mechanisms (revealed during the simulator validation process) contributes greatly to the design of more effective change programs.

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Creditcard's dynamic change-design program began with simulating all of the then-proposed options for reversing long-standing share loss. Most of them proved to be ineffective, either because they did not address high-leverage points in CreditCard's market dynamics, or because they were defeated by offsetting feedback mechanisms. A few proved to be harmful because of damaging side effects.

The next step in Creditcard's dynamic change-design program began with sensitivity testing of every node in their simulated network of feedback mechanisms to determine its influence on market share and profitability. Hundreds of elements were tested and rank-ordered from least to most beneficial. Performance proved to be fairly insensitive to most of them and extraordinarily sensitive to a very few.

Once the few highly leveraged feedback mechanisms have been identified, dynamic design and testing of candidate organizational changes can begin. Design means devising and simulation-testing organizational-change options and combinations of options for their ability to bring about desired performance improvements in the face of uncertainties. Often hybrid combinations of change-options reveal dynamic synergies that make them considerably more effective than the algebraic sum of their individual components. The Steering Platform makes it possible to differentiate between robust organizational change options that improve performance under a broad range of business conditions, and those that are more condition-specific.

With Creditcard's few high-leverage points identified, a solution quickly emerged that would favourably affect four of those points. The solution (co-branding of credit cards) was controversial because it ran counter to accepted industry wisdom and had previously been publicly rejected by Creditcard and its main competitor for fear of brand-value dilution. But dynamic testing demonstrated that co-branding would sharply reverse share loss and increase profitability, and top management quickly embraced it. The Adaptive Steering Platform enabled them to see and understand how that apparently radical change would favourably alter the balance of Creditcard's performance-driving feedback mechanisms.

The high speed of the ASP becomes invaluable in testing change-options and option combinations in the face of multiple risk factors. Speed greatly expands the envelope of management options that can be evaluated and the envelope of risk factors against which those options can be tested. High speed allows automated optimization of multiple change options in the face of multiple risks, a process that often yields organizational-change solutions that had not previously been considered and performance levels that were previously thought to be unattainable. The much lower speed of traditional tools makes such analyses a practical impossibility.

When the government customer ordered Aerospace to change to Integrated Product Development Teams (IPDT) part-way through the Engineering portion of their first aircraft-development program, management feared a disaster. Development programs that were vehicles for large-scale process changes invariable experienced all the cost and disruption from those changes but few if any performance gains – the benefits seemed to accrue only after the development program was over.

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But program managers had two things in their favor: 1) freedom to choose from among a number of alternative definitions of IPDT; and 2) an Adaptive Steering Platform for their program already in use guiding management decisions. To their surprise, the ASP revealed an IPDT definition that was well-suited to conditions on the program and would actually improve performance during the course of that program – a result that had been thought impossible. The ASP also demonstrated that other IPDT definitions would significantly damage program performance. Implementing the chosen approach did improve performance, and the customer subsequently commended Aerospace for conducting one of the best-managed programs of that time.

The government customer was so pleased with the benefits from IPDT that they ordered Aerospace to do the same thing on their next aircraft development program. But Engineering was much further along on that program when the change was ordered, making it harder to reap the benefits of IPDT and more difficult to avoid the downside risks of a large change effort. Fortunately the next development program was already conducting ASP-based analyses of their performance-driving dynamics, and quickly began dynamic testing of IPDT alternatives. In short order the ASP revealed that the particular IPDT design chosen on the preceding development program would be a disaster for the next one, substantially increasing program-performance risks with little or no expected performance gain. Fortunately the ASP also revealed that a different IPDT option would be much better suited to conditions on the next program. That option was implemented and yielded significant performance gains.

On both programs an Adaptive Steering Platform enabled Aerospace to demonstrate to their government customer why their organizational-change choices were the right ones, and how program performance improved as a result. This contributed greatly to the customer's happiness with results on both programs.

The product of this process is a set of organizational changes that management is confident will achieve targeted performance improvements even under uncertain conditions. Confidence stems from having selected the best of a wide range of change options that were analyzed both singly and in combinations and in the presence of multiple uncertainties and risk factors. The change-definition that emerges from this rigorous process is the systematically developed design of the organization's post-change end-state. This ASP-enabled process is, in effect, Computer-Aided Engineering (CAE) for the organizational change itself.

Comprehensive, systematic dynamic testing of organizational changes aids in winning commitment to change from key organizational stakeholder groups. Without such testing, prolonged and hard-to-resolve debates are likely to rage about the nature of the changes needed. Such debates often result in cautious, compromise solutions that fail to yield the desired performance improvement. ASP-enabled testing helps build stakeholder support for bolder choices that yield improved performance while simultaneously reducing risk, which is a recipe for substantial performance gains. Demonstrating this in advance helps win over stakeholders.

The strongest opposition to co-branding came from the Creditcard-issuing banks that were Creditcard's owners. The banks were convinced that co-branding would compromise and might even destroy the value of the brand they had invested in for so long. Creditcard's ASP played a

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key role in demonstrating that the opposite was true and in winning the banks' approval of this bold change. The confidence made possible by dynamic ASP-enabled analysis and the magnitude of the performance improvement that those analyses demonstrated meant that the boldest change actually involved the least organizational risk. Co-branding was introduced and ASP analyses were confirmed by Creditcard's rapid reversal of its decade-long market share losses, coupled with a tripling of profit margins. In the first few years following the industry-revolutionizing implementation of co-branding, the banks earned $5 billion of additional profit on their Creditcard business.

Managing the dynamics of change

Large-scale organizational change usually involves multiple component changes and requires considerable implementation time, making it impossible to implement all changes simultaneously. Therefore changes must be implemented at least partly in series, necessitating interrelated decisions about sequence, pacing, temporal overlaps and the level of resources devoted to implementation.

This means there are many potential implementation paths to the organization's new end-state, each of which involves a different combination of sequence, pace, overlap and resourcing options and will yield a different organizational trajectory from old performance levels to new. That fact gives rise to still more principles of organizational change.

#4a: The organizational changes and their implementation path are connected by the organization's dynamics. That's why the choice of a change-implementation path often has more impact on the organization's post-change performance than does the definition of the change itself. A plausible but poor choice of implementation path can more than overcome the benefits from the right package of changes.

#4b: In large-scale changes, organizational performance often worsens before it improves. Many change implementations involve significant transitional reductions in organizational performance before improved performance begins to manifest itself.

#4c: The majority of transitional performance losses are likely to be dynamically benign, that is, they will disappear naturally as the organizational change takes hold. A few will be potentially malignant, that is, initial losses have the potential to reinforce themselves in a downward spiral of deteriorating performance for the organization as a whole. Traditional analysis methods are not capable of differentiating between performance losses that are temporary and benign and those that are potentially malignant.

#4d: Every candidate change-implementation path is subject to internal and external uncertainties that can significantly alter the expected performance transition and the absolute levels of post-change performance.

To use a medical analogy, an organizational change is like surgery. The medical team must design both surgical and support processes to sustain the patient throughout the surgery and afterwards. The right surgery conducted with the wrong processes or with inadequate operative

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or post-operative support can more than offset the benefit of the surgery itself. As the old joke goes, "The operation was a success but the patient died."

In Subway's case the government chose (for fiscal and political reasons) a change candidate that their ASP showed would involve a fairly high level of risk to Subway's long-term performance. But dynamic testing of alternative change-implementation approaches quickly revealed even higher performance risk from poor change implementation, which was demonstrated to damage Subway's performance beyond the possibility of recovery. To everyone's surprise, the ASP also demonstrated that the beneficial effects of good implementation would more than offset the consequences of the Government's high-risk change selection. This allowed Subway to proceed, focusing on the factors that were shown to be critical to effective implementation of the government's selected change candidate.

Subway began looking at change implementation with a list of 50 (!) factors and processes that were thought to be critical to performance and to the organization's long-term health. ASP-based simulation analysis quickly showed that the difference between change-implementation success and failure would be determined by just three of those 50 factors. Without Subway's ASP, the likelihood of focusing on the right three factors would have been vanishingly small and severe damage to Subway's viability would have been almost certain.

The government's chosen change candidate involved commercializing the provision of system infrastructure (track, stations, rolling stock) and related services. Multiple private firms would compete to win these contracts, none of which had any prior experience operating subway systems. Effective change implementation required that these firms understand the critical success factors and structure their bids around them. Subway made its Adaptive Steering Platform available to the bidders as a rapid-learning tool and instructed them to use the ASP in preparing their bids. Then Subway used the ASP to deconstruct those bids, find the underlying assumptions, and evaluate which of the competing firms were in the best position to ensure Subway's long-term health and improved performance.

Use of an Adaptive Steering platform gave Subway much greater clarity regarding their multiple change options, and played a major part in defining and carrying out the change program.

The ASP is a vehicle for systematic testing to determine which change-path alternatives work best with selected organizational changes in the presence of organizational and market uncertainties. With the ASP, change managers can redesign or abandon an otherwise attractive change design that is likely to be tipped by implementation-risk factors into producing malignant performance losses. They can select a change-implementation option that will not reduce organizational performance too much or for too long during the transition, and that will produce obvious "early wins" to help build and sustain the commitment to change. This ASP-enabled process is, in effect, Computer-Aided Engineering (CAE) for the change-implementation process.

When ASP analysis shows that change-program risk is still too high under some uncertainty scenarios, then simulation-based contingency planning can be built into the implementation design. The ASP can used to devise early-warning metrics for the mix of conditions emerging during change implementation – is it the favourable expected set or the dangerous conditions that were thought to be less likely? The ASP can also be used to devise and test an alternative ending to the implementation plan, a "plan B" designed for better performance under the less

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favourable conditions. Monitoring the key metrics will tell management whether and when they need to shift to the alternative implementation plan.

This illustrates the importance of dynamically-based metrics to the success of managed change-implementation efforts. The Adaptive Steering Platform is used to devise and test metrics for broadly monitoring the organizational change and its implementation. These metrics are derived from risk-based simulation analyses that show where signs of organizational-change success or failure will appear. Such metrics are vital for organizational-change safety because they provide management with interim feedback while there is still time to take corrective action. During the change, any real-time deviation of these metrics from their expected trajectories can be investigated immediately, both on the ground and via simulation analysis. If necessary, investigation should lead directly to ASP-enabled testing of corrective actions and their implementation.

Without such metrics, problems are much less likely to be detected in time to resolve them. The opposite is also true – changing complex feedback networks often produces alarming dynamic side effects that portend no real organizational danger. Without rigorous metrics that anticipate those side effects and demonstrate that the change is proceeding as expected, management may be panicked into abandoning or hastily modifying the change process in mid-course.

Having implemented substantial changes to their new-product development processes, TelTech watched in growing alarm as their next product development effort began generating large and unanticipated amounts of early design rework. Rework can be hugely damaging to cost and schedule performance and to quality of the finished product, and many TelTech managers took the alarming development as proof that their process changes were failing. ASP-based dynamic simulation analysis showed that the opposite was true – the abnormally early rework was a clear sign that the organizational changes were working, and the absence of such rework would have demonstrated that the changes were failing. With confidence bolstered by understanding the feedback mechanisms driving the unexpected phenomenon, management persisted and the changes produced significant performance gains.

Conclusion

The success and failure of large-scale organizational change efforts depend fundamentally on organizational feedback mechanisms: first, because those mechanisms drive organizational performance and their operation must be altered in some way to improve it; and second, because alterations must usually be made while those mechanisms continue to drive organizational performance. To be assured of successful and efficient organizational change, those feedback mechanisms must be reflected in the design and testing of both the change and its implementation plan. Unfortunately, traditional performance-analysis tools and methods shed little light on the operation of the organization's underlying dynamics.

Dynamic design and testing greatly increases the reliability and efficiency of organizational-change efforts by making key performance drivers much more visible, understandable and manageable. Adaptive Steering Platforms are the design and test vehicles, increasing the likelihood of success in large-scale organizational changes by:

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- Locating the most powerful change levers within the organization;
- Making it possible to design organizational changes around those levers and dynamically test them for robustness in the face of uncertainties and risk factors;
- Making it possible to design change-implementation plans to minimize transitional performance losses and downside risks and to test those plans for robustness in the face of uncertainties and risk factors;
- Dynamically testing the organizational changes and implementation plans in combination, in the face of uncertainties and risk factors;
- Demonstrating to stakeholders which change and implementation options will work best, and why;
- Monitoring organizational-change results in near real-time and dynamically evaluating the need for corrections and improvements along the way;
- Confirming and communicating to stakeholders the performance improvements resulting from the change program.

An Adaptive Steering Platform enables managers to concentrate change resources much more effectively, increases expected performance gains from organizational changes, and substantially reduces downside risks. With more and bigger organizational changes needed all the time, Adaptive Steering Platforms earn a very high return on investment.

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