

Closing the Loop

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1 Introduction

Increasingly the process sector has understood the importance of identifying opportunities to improve, root cause analysis, structured strategy development (RCM, RBI etc), but how many of us are good at completing the process – actually ensuring that the processes are embedded and results delivered? How can we avoid falling into the cyclic habit of over-selling a particular ‘solution’, achieving temporary enthusiasm, then disillusionment, disappointment and surging off in a new direction?

This paper considers the generic issues of motivation, commitment and the creation of an asset management culture in a sustainable form. These problems, and how they are managed, are then illustrated by a ‘live’ case study of successful an organisation attempting to ‘closing of the loop’ at different levels of technical problem-solving, programme delivery and strategic organisation development.

2 Why initiatives fail

There is no shortage of good ideas and improvement opportunities. Management methodologies are breeding fast, new technology is appearing daily, and we only have to ask the operators and technicians to discover plenty of current ‘lost opportunities’ that we could focus upon. Why, then, do we have such trouble in actually fixing the problems, implementing the innovations or embedding the associated changes? Very rarely is the root cause a technical one. Nearly all cases point to process or human factors not being adequately considered. The following paragraphs discuss factors that have resulted in initiatives failing to deliver, and provide examples of successful strategies for avoiding these pitfalls.

2.1 Process & technology vs. people-centric thinking

There has been plenty written about the management of change and transformation (focussing on people), and there is vast amounts of guidance on structured methodologies relating to new technologies and ‘best practice’ processes. However such good advice tends to fall into one or other of the two main camps:

- > Human resources focussed: the culture, motivation and psychology of the workforce/managers

Or, more commonly,

- > Toolkit focussed: tackling the plant, methods and scientific process.

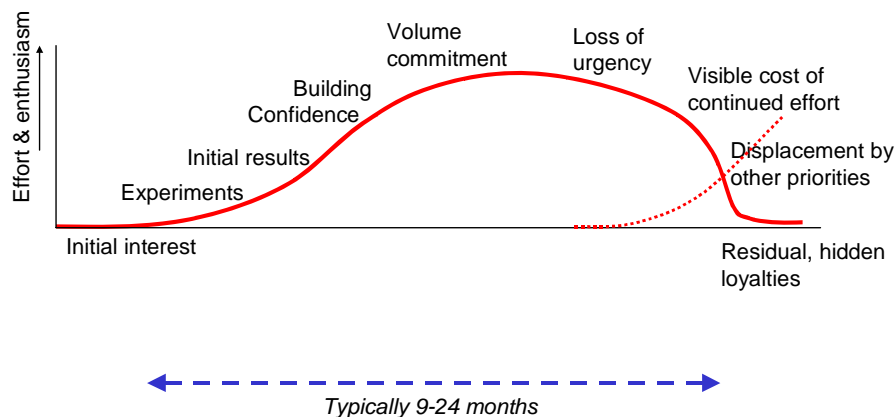
Few methodologies or technical innovations adequately consider the human dimension, and many HR-oriented good practices seem ‘soft and woolly’, lacking tangible tools and evidence of value (so there is often more ‘lip-service’ adherence than fundamental behaviour change). Engineers are not particularly good at

communication skills and ‘people issues’, while organisational psychologists or HR staff sometimes appear to talk a quite different language to the technical/operational workforce. So a combination of silo thinking in the planning stages, and language barriers in the implementation, ensures that that very few initiatives or change programmes successfully combine the right amounts of technical delivery and ‘soft issues’ consideration. Successful innovation usually requires both the cultural and technical dimensions to be appropriately managed, and the key is often good communication between the two.

In addition to this problem of hard/soft issues coordination, there are other fundamental challenges:

2.2 Enthusiasm-decay cycles

Some people like constancy and the comfort of the familiar. Others crave variety and the intellectual stimulation of novelty – new is more fun, the familiar is boring. A lot of us show both attributes: conservative in some areas and innovative in others. ‘Tribal’ groups within organisations, however, exhibit certain patterns of these instincts. Engineers like to investigate and experiment (no two design solutions are the same, even for identical functional requirements). Fitters and technicians can develop fixed judgements on ‘what works’ and apply a conservative ‘filter’ to proposed innovations (‘keep your head down and it will all blow away again soon’). Managers often see the need for change and accept innovations intellectually, but fail to carry them through, implement them properly or provide the necessary stability and sustained direction. The result of these tendencies is a cycle of enthusiasm and decay for each new idea or ‘solution’.



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Figure 1. The enthusiasm-decay cycle

Often, the main benefits of each new ‘great idea’ have not even been realised before another flavour, direction or opportunity is launched, killing off the remaining momentum of the former. Notice however that residual, often hidden, enthusiasts remain - convinced of the viability and value of the previous ideas but forced into silence by the arrival of the next great ‘solution’. The challenge for us all in the future, of course, is to stabilise the worthwhile elements of each good idea, until they become ‘normal’ and a base platform for further improvements and innovation. Such genuine, cumulative and continuous improvement is the goal we aspire to, and

glimpses of it have shown really massive impact on corporate performance and culture (e.g. the North Sea Oil & Gas sector during the 1990's).

2.3 Management Churn

This cyclic behaviour is particularly obvious in the adoption and failure of many 'three letter acronym' management methodologies. Many organisations 'tried' Total Quality Management in the 1960's, or RCM, TPM, RBI, RCA, 6-Sigma etc over the last 10 years – with highly varied success and sustainability. The management team picks up the latest 'best practice' (often from conferences or peer recommendations), tries them successfully in pilot form, commits to significant investment and adoption, and is disappointed by the longer term failure to deliver sustained results. Where this is the case, part of the problem usually lies in the implementation process itself (inadequate provision for training, communications, feedback measures etc, considered below), but management turnover also bears some of the blame. Managers often rotate or move on every 2-3 years and I have seen cases where this has been as short as 6 months (the *average* time between changes of 'boss'). Each, understandably, wishes to exert his or her flavour and priorities, often deliberately contrasting with those of the predecessor, irrespective of merit – so the workforce gets a regularly changing message, dampening their enthusiasm for any new direction, in anticipation of subsequent changes.

Creating a constancy of purpose, therefore, is difficult. Long-term directional clarity conflicts with short term reputational self-interest. This is particularly true in cases where the performance measures reinforce short-termism, and no up-front value is placed on downstream effects. In such an environment it is easy to earn a good reputation if you cut costs and move jobs before the consequences are felt!

2.4 Conflicting corporate goals

Increasingly we recognise the need for incorporating risk, reputation, customer & society expectations and whole-life considerations into our management 'radar'. We are beginning to recognise the interconnectedness of all we do and the need to optimise the whole picture (see figure 2 below) rather than just cut costs and improve performance within functional silos. But this leads to significant problems of measurement – it is all too easy to default into measuring what is easy to measure rather than the less tangible evidence of results and repercussions. Balanced Scorecards are an attempt to address this issue, but lack one fundamental element – a balancing mechanism! They do, at least, force a wider monitoring of both results (lagging indicators) and enablers for future sustainability (leading indicators). However the cause-effect relationships remain obscure – how much are improvements in one measure (say, customer satisfaction) worth sacrifices in others (operating costs, for example)? Two different issues are at stake here:

- > Measurability (data/information confidence & credibility)
- > Trade-off relationships (and the need for optimisation)

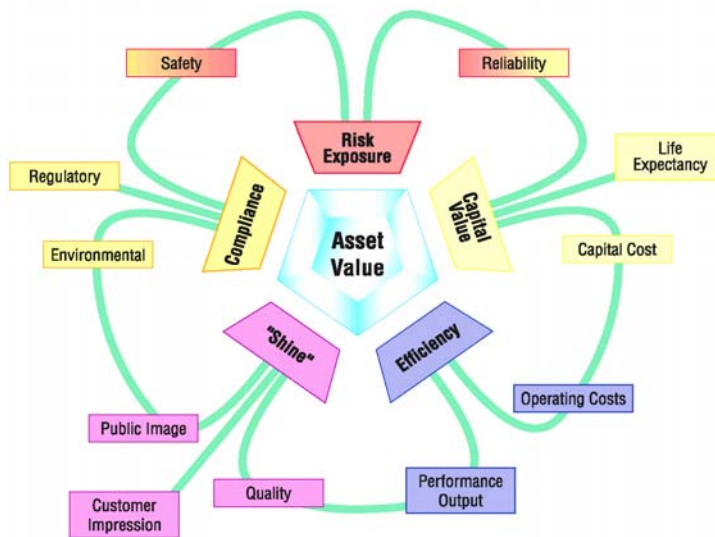


Figure 2. Conflicting objectives in the Scorecard need optimisation for “Total Business Value”

Both the subjects of information quality and of handling trade-off's have received significant attention over the last few years. The optimisation area was comprehensively addressed by the European MACRO project¹ (which developed tools and tackled the decision-making disciplines with or without hard data). And the information quality/measurability aspects have been at the heart of countless initiatives in data capture and analysis, condition monitoring, market research etc. Certainly some dimensions are more naturally difficult to quantify, or to demonstrate as cause-effect relationships (such as risk, customer impression or staff morale), but there are quite sophisticated methods available for quantifying even these (and the degree of confidence in the results). Their adoption and usage, however, remains generally poor or patchy, and many companies have not yet grasped what is possible in monitoring *and using* appropriate evidence, even in the ‘intangible’ areas of risk, reputation and morale. Many still complain both of being data-swamped and, simultaneously, of not having the information they need to make better decisions!

2.5 Conflicting Personal Goals

Compounding the ‘hard data’ issue of measuring success and identifying the best compromise, there is a further human factor involved – the mismatch between these corporate goals and personal objectives and priorities. Whatever the business benefits of doing the right thing, in the right way, it is difficult to convince staff to adopt such practices if they conflict with self-interest. Such misalignments can develop for either of two main reasons:

- > Genuine conflict between the corporate and personal objectives, most commonly found as inter-departmental tensions (a design/structural problem that needs to be resolved or trade-off mechanisms developed)

¹ See www.twpl.co.uk and www.aptools.co.uk

- > Perceived clashes, particularly due to inadequate understanding or subjective interpretations of weighting/priorities (communication or awareness problem)

In many cases such (genuine or perceived) conflicting objectives are the underlying reasons for resistance to change or innovation. The concepts of Transformation Management² have emerged to reduce these effects by anticipating, and then mitigating, the impact of change upon personal motivations, concerns and the ‘baggage’ that inevitably results. There is also plenty of choice, nowadays, in performance-related reward models (individual and team-based) and ‘shared risk/reward’ mechanisms for contracting, alliancing and service level agreements. A fundamental, but often neglected, part of such processes, of course, is the close, active linkage between business plan, performance criteria and personal responsibilities. The solutions are available, but it is sad to see so many initiatives paying inadequate attention to these factors, and suffering or failing as a result – and even risking a return to the adversarial and counter-productive relationships of historical industrial relations.

2.6 Understanding & Education

The increasing fragmentation and specialisms necessary to operate in the modern technical and commercial world have created a significant education lag. Despite the exhortations of HR managers and claims that “people are our greatest asset”, the reality is that the training budgets, apprenticeship/mentoring activities and competency/experience lead-times are lagging further and further behind the concepts and practices of leading edge Asset Management. I deal with companies from the top of the ‘world class’ benchmarks and from Third World/developing nations with only the very basics of technical and infrastructure resources. What impresses me about the latter is their appreciation for, and investment in, training and education programmes – I know cases where all 20,000 employees gets a minimum of 1 week classroom education each year, and around 30% of all professional staff have had fully sponsored overseas study for higher degrees. As a result, albeit operating in a more basic environment, their staff often outperforms, and has a more up-to-date understanding of best practices, technology usage and continuous improvement, than their First World momentum-rich counterparts. The ‘payback’ for this level of investment has been proven time and time again.

In Europe we have probably the most advanced, joined-up models of integrated asset management. This is still evolving, I know, but nevertheless significantly better than the ‘silo’ cultures of the past. Education providers, however, have not caught up with these developments, and there is a big gap between, say, the curriculum of a typical engineering degree and the skills/competencies now expected of a graduate engineer (particularly in the risk management, economic/business and communication skills). The UK Institute of Asset Management³ is currently leading a project in this area, studying the gaps and developing a certification scheme to encourage more appropriate personal development programmes for the future.

² See “The Management of Transformation” by William Bridges

³ See www.iam-uk.org or contact the author (john.woodhouse@twpl.co.uk)

2.7 Communication and alignment

Linked to the education and understanding is the subject of communication. Isolated islands of awareness and locally-interpreted, or filtered, messages tend to erode enthusiasm and throw programmes off track. This is where good leadership really matters – both in establishing consensus on direction, and in translating such objectives into language that everyone can understand and commit to. All too often, business managers get bogged down in operational and administration activities and fail to raise their sights to medium and far horizons: too much ‘control, interfere and instruct’ and not enough ‘listen, inspire and encourage’.

National and industry cultures differ widely in this regard – from the Anglo-Saxon vertical, more rigid hierarchies with fairly strict decision disciplines to the Gallic-Latin looser, collaborative, flatter organisations with collective responsibility but often unclear accountabilities. Problems of communication and alignment differ correspondingly. Rigid, vertical structures tend to have strong, top-down leadership but inadequate recognition and exploitation of workforce creativity, and can suffer delays and distortions of getting the message up and down the pipeline. The ‘management by committee’ style, in contrast, achieves greater shared awareness and collective identity, but often struggles with developing clarity of purpose and decision-making. Both cultures can learn useful lessons from each other, but the implications and solutions will have to be personalised.

2.8 Trust

Finally, one of the most difficult subjects to handle is that of interpersonal confidence and rapport. Mutual trust has a profound effect upon the likely success or failure of any initiative. Leadership skills certainly help, but there are also the peer-to-peer relations, team membership ‘fit’, personalities and a host of other subtle but very influential factors to consider. Trust takes time to develop, and is easily damaged. Shared mission statements, ‘charters’, contracts and service level agreements can be carefully designed and apparently consider every contingency, but if the mutual trust is lost, the relationships will not work. On the other hand, visible integrity, good leadership and personal empathy can make even a poorly planned initiative succeed – problems get solved as they are encountered.

We can identify several circumstantial factors that encourage the building of trust - co-location, continuity of contact, shared personal values or hobbies, aligned objectives - and mutual confidence certainly emerges when teams are faced with, and cope with, adversity (so ‘outward bound’ courses, raft-building or crewing a sailing boat together can have positive value, even if such tasks have little to do with normal working activities). Generally people ‘rise to the occasion’ when called upon, provided that they are sufficiently involved and supportive of the objectives. In recent years, however, ‘false economy’ cost-cutting, unthinking outsourcing, and the visible difference between management words and actions, have combined to erode staff confidence and commitment in many organisations - and the rebuilding of trust will require sustained positive demonstration of new behaviours.

3 The three layers of implementation

In the projects we have been involved in during the last 10 years, spanning most industrial sectors and over 25 countries, a pattern has been discernable. Like many facilitators, implementers and consultants, we have increasingly recognised that the human factors are the key to successful adoption of new practices or technologies. However there is a further dimension that is helpful in ensuring sustainable implementation – a hierarchy of planning that links specific, tactical tasks into an overall organisational direction, and connects the corporate aspirations and strategic goals to the practical constraints of operational realism.

There are three layers to this hierarchy; the ‘Specific Project’ layer, the company ‘Rollout Programme’, and the ‘Strategic Route-map’. Ideally, of course, the first is a component of the second, which contributes to delivery of the third. However, due to the various problems covered above, and the responsibilities for such planning horizons lying in different hands, this connectivity is rarely achieved or sustained.

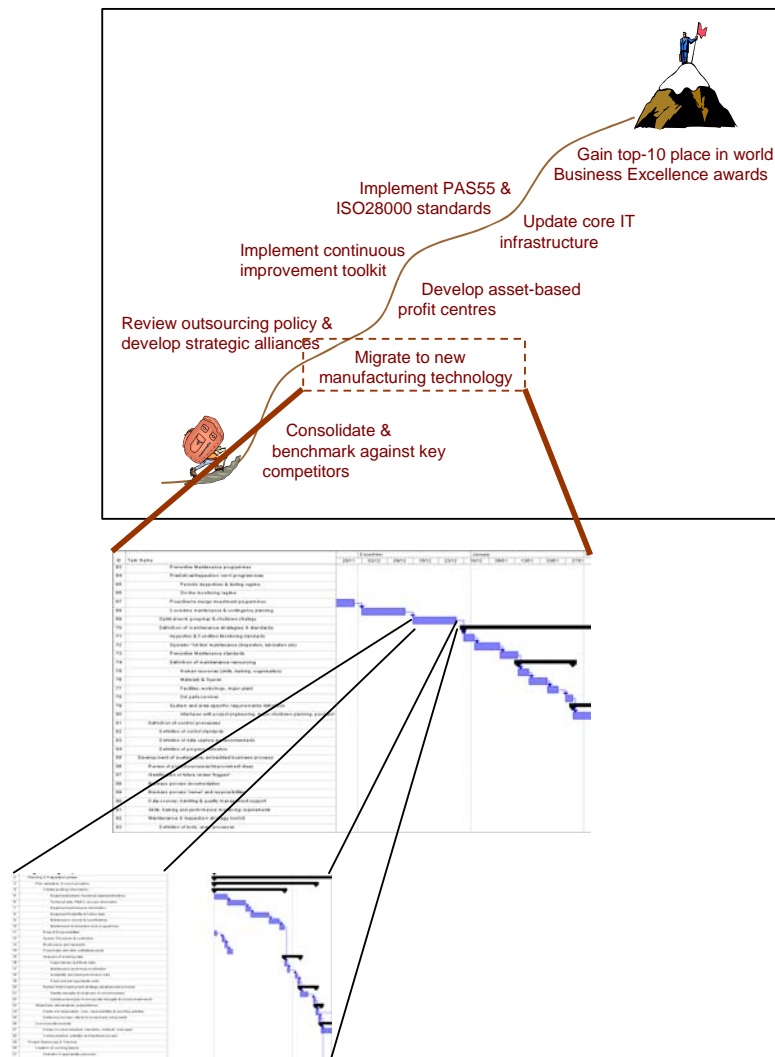


Figure 3. “Specific Project”, “Rollout Programme” & “Strategic Route-map” plans

Figure 3 shows the bottom two levels of planning as example Gantt charts (to reinforce the style of structured anticipation and coordination). Unfortunately such representations risk one of the problems mentioned in section 2.1 above – the mechanistic change management viewpoint being used as the sole basis for communication – underestimating the important emotional/human factors (better understanding of the programme, and the various roles and expectations within it, would be achieved if the explanation method and language are tailored for the difference audiences). At each level the communication strategy, the responsibilities, the progress measures and the language have to be appropriate and understandable to those involved. Logical connections between the layers must not be lost, of course, but the presentation and controls have to be personalised in order to obtain the necessary ‘ownership’ and commitment to delivery.

4 Joining up the total story

If we can think ahead and anticipate the human factors more, the communication strategy can be greatly improved. However the biggest problems usually lie in the other barriers – cyclic ‘enthusiasm-decay’ habits, lack of understanding, conflicting goals etc. Some of these can be addressed by making sure they are better considered in the investment and implementation plans (e.g. education – not just technical training in the *how*, but also broader understanding of *why*). Other issues call for a change in style of leadership or management. There is no shortage of advice and good examples of *components* for such better practices, just a shortage of the combined total picture working together. This involves a real, cumulative learning process that stabilises the platform reached by one initiative to become the launch-pad for the next improvement.

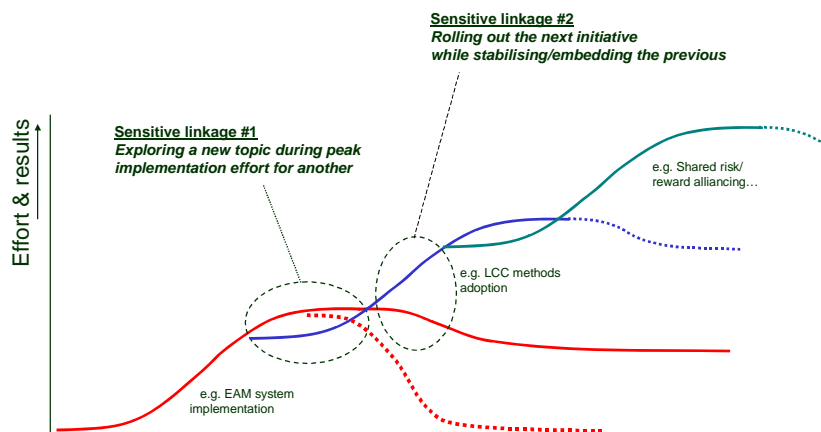


Figure 4. Maximising the linkages

To avoid the cyclical ‘enthusiasm-decay’ curve, we need to understand and maximise the linkages between activities – finding and sharing the reasons/benefits of one in laying the groundwork or enabling the others. Two particularly sensitive phases exist in this process:

- > exploring and piloting the ‘next idea’ while everyone is excited and committed to rolling out the current initiative
- > maintaining commitment to, and changing the management style of, the ‘stabilising’ phase in the last improvement while the ‘new stuff’ is gaining interest and momentum

4.1 Looking ahead to the next idea

When all the attention and effort is being directed at current initiatives, it is difficult to find resource, time or motivation to think ahead to “what’s next”. At the top management levels, the Strategic Route-map tends to be phrased in loose terms to describe the perceived area of requirement. We cannot plan the whole mountain ascent in detail; we have to see how the ground lies from each successive shoulder. Planning each phase of the ascent involves a significant lead-time (as well as distraction potential) in scoping, piloting, budgeting and resourcing, and it is difficult to judge when to start this process. If we start too early, the message is lost in the impetus and distractions of current priorities. If we wait until there is time and resource available (as the last implementation effort starts to level off), then the planning & proving lead-time for the next initiative risks a loss of clear corporate direction and momentum.

To address these risks, some seed funding and small team responsibilities have to be set up *while the current initiative is at its peak rollout phase*. This takes management effort (to ‘protect’ these resources from the inevitable demands of the current ‘core’ priorities). Such a small team (or even a specified individual) needs freedom of movement to investigate, scope, plan, budget and test the next area of focus, working on the assumption of successful implementation of the current initiative as the base platform.

4.2 Stabilising and embedding

As the effort in any ‘rollout’ reaches a peak (nearly all initiatives have a bow-wave of such effort), the sense of novelty and excitement reduces and management awareness shifts more to the costs that are being incurred. This is the big danger point, where momentum is so easily lost (and a ‘new direction’ adopted *at the expense of the last, whose benefits are then largely dissipated*). A different implementation and management style is needed in the ‘embedding’ phase – in Belbin’s behaviour terms⁴, the ‘Completer-Finisher’ characteristics rather than the ‘Shaper’ and ‘Implementer’ skills needed to drive the main rollout.

Two aspects appear to be key in ensuring good ‘embedding’ (over and above the obvious aspects of good feedback, use of KPI’s of benefits realisation etc):

- > Changes in project leadership (the champions who have led and delivered the main thrust need to be acknowledged, but roles now change to ensure business processes adapt to the new circumstances – and such ‘housekeeping’ would be seen as mundane by a ‘Shaper’-style project champion.

⁴ See www.Belbin.com

- > Culture change achieved by new small habits: conscious Transformation Management of the ‘getting comfortable’ phase, involving practicing activities and reinforcements (to establish the new habits), team- and trust-building, sustained visible management interest in results and plenty of investment in education.

5 Case study

There are remarkable few examples of ‘getting it all right’. Most companies can point to good individual implementations of specific topics, but very few can say they have created a cumulative, joined-up process. A representative ‘learn as we go along’ story relates to the very considerable transformation currently underway in London’s metro rail system (London Underground). The political and technical background is a mess⁵, following 20+ years of under-investment in one of the oldest, most complex metro systems in the world, along with cycles of governmental interference and neglect and, over the last 3 years, the introduction of an extremely complicated Public/Private Partnership (PPP) contract for outsourcing the infrastructure management for the next 30 years.

Now the infrastructure is managed in three contract areas, grouped by the main ‘tube’ routes, with a strongly performance-related payment/penalty scheme and a committed investment programme of GB£13 Billion (over US\$20,000,000,000). Also included in the contract is the requirement for an ‘Asset Management Regime’ that optimises whole life costs, plans for anticipated changes in demand, and guarantees performance/condition even beyond the contract horizon. A great deal of time and expense went into the design and pricing of the contract, which necessarily included a very high degree of uncertainty and risk – the legacy data systems were acknowledged to be very poor and fragmented, the condition of (particularly civil) assets was largely unknown, and the scope for improved working practices and changing staff ‘culture’ where highly speculative.

The story is by no means complete and is still unfolding, but it does illustrate a good example of ‘closing the loop’ from anticipated, largely faith-based planning to practical implementation (including massive technical change and significant consideration of the ‘soft issues’) and results achievement. One minor example from this cycle relates to the identification and adoption of new track replacement strategies.

5.1 Specific Project level

The subject of track replacement is surprisingly complex – the track components look fairly simple (rail, fastenings, sleepers, ballast etc) but there are plenty of system interdependencies that influence deterioration rates, cracking mechanisms, failure consequences and remedial opportunities. The optimal inspection and renewal strategy for straight track is likely to be different to that for curved track, underground and open sections differ, and there are various options for rail design, concrete or wooden sleepers, ballast material etc. So, to build a comprehensive and appropriately

⁵ See “Down the tube” by Christian Wolmar

cost/risk optimised track renewal programme from the ‘bottom up’ evaluation of specific components is a significant effort – and the money involved is big also!

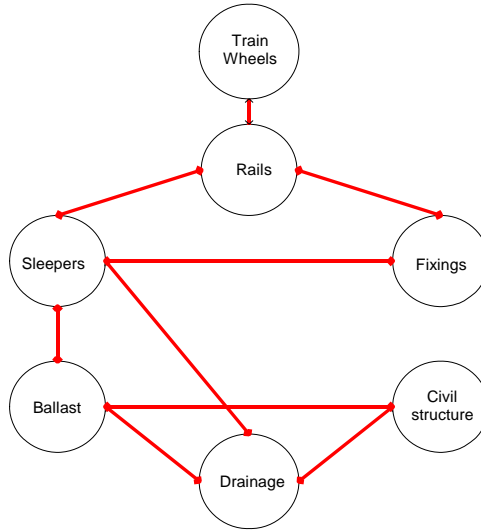


Figure 5. Conditional interactions affecting system degradation

With very little hard data available on the current condition of many components, and a great variety of operational, historical and geographical characteristics, the technical analysis of this system is pretty difficult. Compounding this further are the natural conservatism of ‘Permanent Way’ engineers and inspectors, very restricted access opportunities (shutdowns) to do work on the lines, heavy regulatory obligations and heightened public sensitivities in the UK in relation to rail safety.

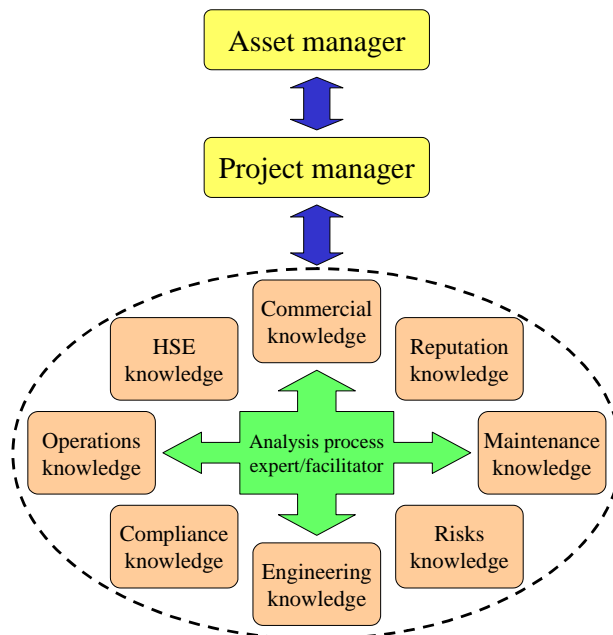


Figure 6. Team dynamics at the specific project level

At the technical analysis level, these complex issues were comprehensively handled with modern risk-based modelling tools⁶, and a multi-disciplined working group following a structured methodology to force the right questions to be asked, and range-estimates/sensitivity-testing of all the areas of uncertainty. This identified the best inspection and maintenance regimes, and the optimum time to renew the rail. It also identified the business case for always renewing the track drainage system at the same time as re-railing – the rail life extension benefits justifying the additional up front costs.

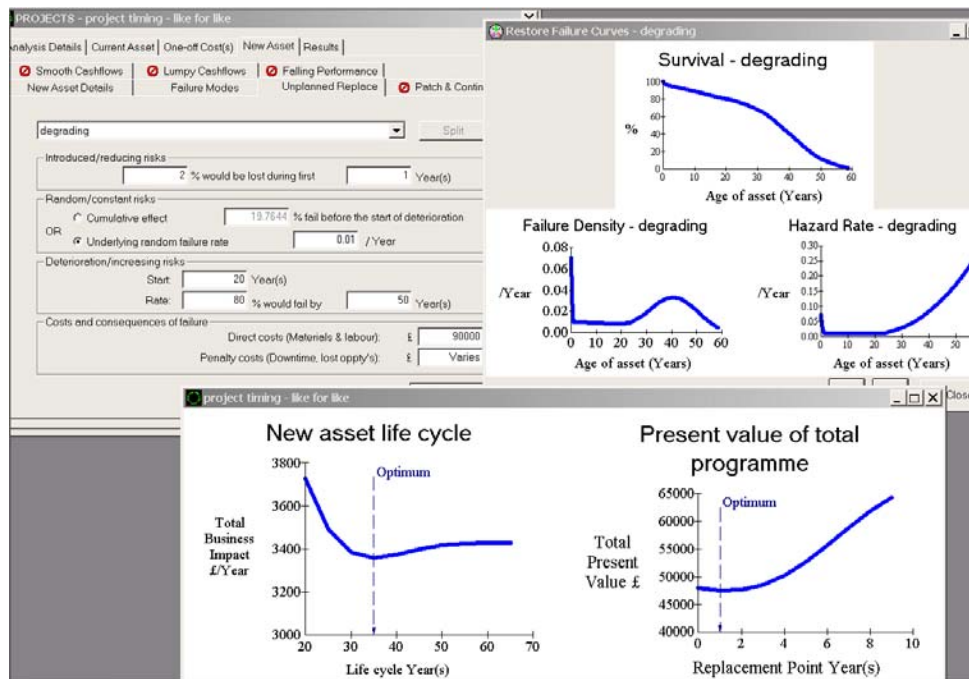


Figure 7. Results of risk-based optimisation of asset renewal timing (using APT-LIFESPAN)

5.2 Rollout Programme Level

With hundreds of kilometres of track to review and, potentially, inspect or replace, the individual studies turn into a significant review programme, with project rollout implications. This means setting up the ‘programme management’ functions, the approval processes, the capital investment budgeting, resource scheduling, stakeholder interface considerations, contractor policy and relationships, and a host of additional communication, coordination and prioritisation factors.

Criticality prioritising and the correct use of templates become extremely valuable to maximise working efficiency. Carefully designed business processes can also streamline the rollout, with due consideration to the flexibilities and the inevitable but unexpected factors that will force changes or re-prioritisations. Whole work programmes can, nowadays, be optimised in both strategic and tactical levels of delivery: this involves cost/risk optimisation of the work bundling and, in the delivery control phase, risk-based control of the resources and critical path. APT-SCHEDULE puts numbers to the first of these (finding the right combination of things to do in the

⁶ See www.aptools.co.uk

first place), plus various ‘add-ins’ such as ‘@Risk’ or ‘Crystal Ball’ for project management tools such as Primavera or MSProject.

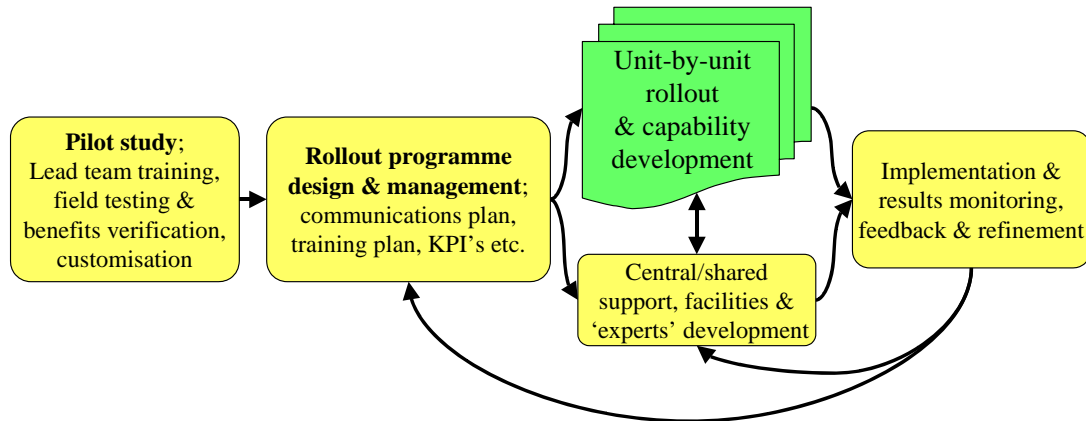


Figure 8. Programme rollout: main elements

On the human factors side, the systematic programme must include specific communication and awareness tasks (those responsible for doing the inspections or renewals must know why they are doing the task in order to want to do it well). In this case, the considerable interests of local government, London Underground Ltd (the operator and client of the infrastructure management consortia), funding bodies, industry regulators and the press all have to be handled – the track renewal programme will result in significant route closures over the next 10-15 years!

5.3 Strategic Route-map Level

The track renewal programme is just one item in the transformation of the London Underground system into an integrated Asset Management regime, itself a key deliverable and contractual requirement. The culture change, data and knowledge management systems, performance criteria, safety and engineering standards, capacity and technology changes and continuous improvement processes are essential parts of this jigsaw – but they cannot be delivered simultaneously, so a prioritised route-map needs to be developed. The overall 30-year contract is organised into four sections of 7½ years and this provides a useful framework for strategic goal-setting: timescales of less than 3 years do not leave enough time for establishing new behaviours and demonstration of the results of innovation. However, plans of greater than about 5 years can be difficult to ‘sell’ to the staff, as such horizons are difficult to relate to personal contributions and accountabilities.

Above the elements pre-specified in the PPP contract, strategic plans are not really joined up and optimised yet, but the intention is clear – not only will the specific projects and rollout programmes be delivered in a sustainable way, but the overarching approach, processes and culture (the “Asset Management Regime”) all need to be established, including the ability to challenge and change the Specific Projects or Rollout priorities. With so much at stake, but planning horizons that allow strategic thinking, it will be interesting to see how this Asset Management Regime is established and used to encourage new behaviours.

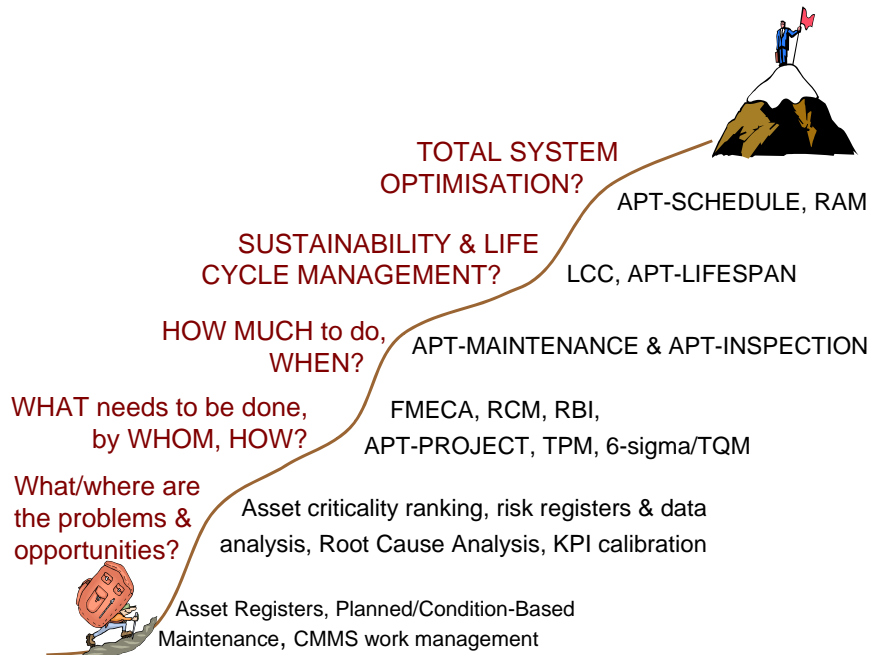


Figure 9. Example overall route-map of methods, initiatives and tools implementations

6 Conclusions

This paper has tried to walk a very narrow path – between enthusiasm for the opportunities and improvement methods that are now possible, and concern about the likely failure of many of them. It has considered some of the common pitfalls, and the key considerations required for real, iterative and continuous improvement. The path cannot be smooth. Apart from the underlying realities of Chaos Theory and ‘the law of unintended consequences’, there are plenty of variables outside our control. It will certainly continue to be safer and more understandable, therefore, to work in a series of digestible-sized ‘initiatives’; each with a start, a middle and a tail, and a catchy title that can be used to rally enthusiasm and common purpose. Linking these together in a cumulative improvement process is a challenge, and this is only possible if we put more effort into education⁷, communication, motivation and true leadership.

Then we can move on from the ‘enthusiasm-decay’ cycles and inject some infectious enthusiasm back into the business. The ‘three-letter acronym’ (TLA) methods and new technologies can only ever provide component tools and processes. The future belongs to organisations that can extract and distil the bits that add value, stabilise them as incremental habits, and keep everyone climbing the same overall mountain. Then they can claim a truly optimised and integrated Asset Management regime.

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 The Woodhouse Partnership Ltd
 ERTC, October 2004

⁷ For a full range of Asset Management training & education options at all levels, see www.twpl.com