

# Business and IT transformation

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Rationale and approach for transformation for  
mobile operators.

**July 2017**

This document investigates the rationale for radical transformation for mobile operators, what the key characteristics of a transformation should be and how it may be done.

The *why* is the cost pressure and the resulting consolidation. The *what* is to prepare for continued cost optimization, value chain disaggregation, and flexibility to permit innovation in distribution and digitalization. The *how* is a radical greenfield approach respecting the disaggregation, addressing the IT challenge in a business simplification context, including addressing some of the more common pitfalls.

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## 1 The problem

The Mobile Telecom Industry is facing increasing pressure to change in the face of declining margins. Continued cost cutting, outsourcing and optimization has been the main responses. While that will continue, it also has a limit; much of the cost base is being stripped to what is truly non-discretionary spending and further reduction requires more fundamental changes.

The root of the problem lies in the fundamental cost structure of the mobile network and its operation: it has a very high fixed and low variable cost, meaning that the marginal cost of the next customer is close to zero. Combined with low ability to differentiate on the product and the regulatory pressure to increase competition by various means, competition will drive ARPU<sup>1</sup> to levels that are not sustainable.

There are two potential remedies that do not require the radical approach discussed in this note, both of which address the revenue side of the issue.

One is a semi-permanent truce in the price wars that tend to erupt, particularly in markets with an “irrational” player. This is contrary to economic theory and effective execution of such a truce may also cause the regulator to intervene. For these reasons, this is probably a temporary measure at best.

The other option is that the mobile network operator, the “MNO”, or the group to which the MNO belongs, will be capable of developing new services that will deliver new sources of revenues. This has been tried many times and yet almost all OTT<sup>2</sup> revenue goes outside the MNOs. And even if it should succeed, why should this, in principle independent, business subsidise the infrastructure?

Failing to believe in such remedies, the conclusion is that the margin pressure will continue and end in consolidation. In order to be in a favourable position to create value out of such consolidation, the financial position must be adequate. Which again requires winning the cost game. And since that is not possible with continued gradual cost cutting, a radical transformation of the business is necessary.

From the cost structure of the MNO and the disaggregation of the traditional integrated value chain (through network sharing, wholesale models, managed service, OTT services etc.), it will be clear that the following are requirements for a transformation:

- The complexity of the MNO should be reduced, if not to the MVNO level, then at least as close as possible while still permitting servicing the relevant segments.
- The capabilities should be modularized in a manner where the value chain disaggregation can be handled.
- Ability to innovate in distribution is a prerequisite for managing the balance between its cost and value.

So this is the problem that must be solved: reduce complexity drastically, permitting structural flexibility while retaining the ability to service materially all segments currently served.

Clearly, such transformation is not incremental and current IT systems generally cannot be updated to handle it.

As this document focuses on the business transformation from the market perspective, focus is on the BSS<sup>3</sup> parts of the system stack, not OSS<sup>4</sup>.

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<sup>1</sup> ARPU = Average Revenue Per User, typically measured monthly.

<sup>2</sup> OTT = Over The Top. Used to denote services that are not integrated with the mobile network, often delivered by different companies, e.g. YouTube or Spotify.

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<sup>3</sup> BSS = Business Support Systems, typically denoting the customer supporting systems like billing and CRM.

<sup>4</sup> OSS = Operation Support Systems, typically denoting the systems used for managing the physical network.

## 2 Industry evolution

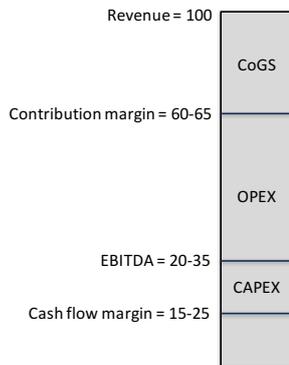
A business and IT transformation that fundamentally alters the products, processes and systems will require substantial investments and define capabilities for the MNO for years. Since a transformation has such wide-ranging implications, a necessary foundation for such transformation is a view of the industry evolution pertinent to the scope of transformation is required.

This section outlines a view on one possible industry evolution in mature markets. *Please note that while one must agree with the fundamental need for radical change for the approach outlined in this document to make sense, one does not have to agree with this more detailed view of the evolution of the value chain in order to use the approach, but parts of the approach will have to be adapted to the view of the industry evolution applied. The key point is to be explicit on the view as a foundation for the specific project.*

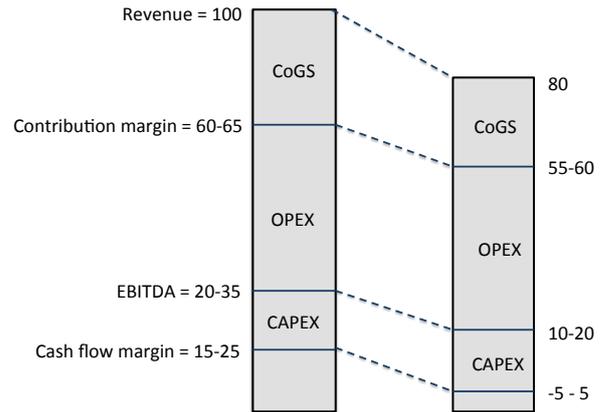
The view is seen from two perspectives: the cost structure of a typical MNO in mature markets and the value chain and potential disaggregation points.

### 2.1 Cost structure perspective

The overall cost structure for an MNO varies a lot from market to market and from operator to operator. However, many operators in mature markets, particularly those that are not incumbents, has the rough P&L shown below.



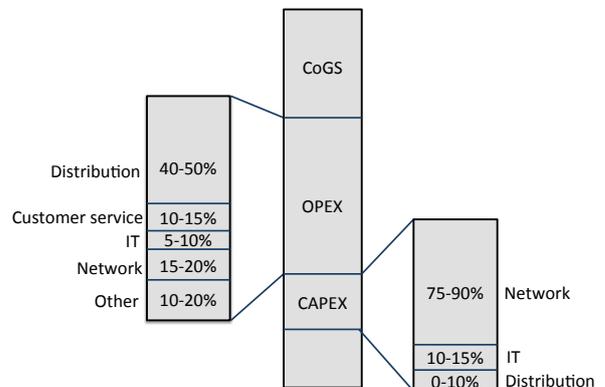
Assuming a decline in revenue of 20%, the picture evolves into a cash flow margin that is not sustainable:



The first option for avoiding this picture, obviously, is keeping revenue stable. While this certainly should be done, the view taken here is that it cannot stand alone as a solution, c.f. the discussion on cost pressure initially

The other option is radical reduction of cost, which is discussed in more detail below.

The part of CoGS<sup>5</sup> that is addressable is typically handsets and similar items, which is covered under the discussion of distribution. So the following discussion focuses on OPEX and CAPEX for the three key areas: network, IT and distribution (including customer service).



The picture above shows a typical distribution of cost within OPEX and CAPEX categories.

#### Network

As this document is related to IT transformation with a BSS focus, network cost is a bit of a digression. But as network typically takes 15-20% of

<sup>5</sup> CoGS = Cost of Goods Sold.

OPEX and 75-90% of CAPEX, some comments are included on this topic.

For an MNO that has taken the tour of cost reduction, an obvious next step is to move to outsourcing for addressing OPEX. This is certainly viable. In particular, it is a lot easier than IT as the level of customization is a lot lower in the network area. However, care should be taken not to overestimate the effects. Firstly since empirical evidence shows no systematic connection between level of outsourcing and cost of network operation. And secondly since 35-50% of the OPEX are outside the normal scope of outsourcing or already outsourced, e.g. site rental, support and maintenance agreements, field force.

CAPEX is a lot easier to control, and should be looked critically upon. However, the CAPEX spend is in all material aspects linked directly to the network assets and therefore directly visible to the end-customer. Optimizing CAPEX spend in the RAN is the topic of another document, "Smart RAN investments), similar to this, that can be found on the web page set out at the end of the document.

However, the only way to achieve truly material reduction in cost on the network is to share the assets with another operator. Here the savings potential is 25-40% of cash spend, surpassing by an order of magnitude all other initiative addressing network cost. Network sharing is the topic of another document, similar to this, available on the web site set out at the end of the document.

## IT

For most MNOs, IT is pretty messy, and the comments here are related to such a situation.

The cost of IT is driven by complexity as a result of the history of the company and related IT development as well as the complexity of the business. IT cost reduction in isolation is certainly possible, and in particular within CAPEX where reductions sometimes can be made without directly being seen by customers, at least in the short term.

For an MNO that has gone through the typical cost reduction process, the residual is probably limited. So further reduction requires more robust measures like retiring or replacing significant portions of the system landscape. Such change, in the absence of a business transformation simplifying the requirements, is a pure IT transformation. The value of such a pure IT transformation is doubtful. It is expensive, risky and unless one is faced with unsustainable end-of-life situations, the business case tends to be dubious.

Significant, sustainable reduction in IT cost requires a simplification, which only a transformation that includes business transformation can deliver.

## Distribution

Distribution accounts for a substantial portion of cash spend in mature markets. These high spends are typically the result of two factors.

Firstly, the brand attractiveness of most MNOs in mature markets is lower than its market share. In order to reduce market spend, it will be necessary to ensure a better balance through:

- Substantially changing the brand perception, which is a good way but also one that takes years.
- Use of multiple brands delivered effectively through materially the same platform.
- Through extended wholesale offerings

These are, of course, not mutually exclusive.

Secondly, MNOs in many markets have an exclusive distribution where premium located shops sell a few handfults of SIM cards per day. And similarly, for B2B sales, an exclusive sales force. This is related to the issue of brand attractiveness, as it represents part of the spend needed to compensate for the imbalance mentioned above. This part of the issue can be handled either through reducing the footprint (which again requires that the necessary customer acquisition then is handled in another way) or to add more value into the distribution, i.e. more products.

For no-frill brands using web as the distribution channel, the cost of distribution can be as low as 20% of the cost of distribution via a full-service physical channel, so the potential is clearly substantial. Looking in more detail at the numbers, the root cause of the difference in cost can be found to come down to the brand question: stable, no-frill MVNOs<sup>6</sup> tend to obtain a balance between brand attractiveness and market share that permits the use of web channels and lower marketing spend.

However, as it is clear that the entire distribution is not going to be restructured overnight, the main point here is that the flexibility to innovate in the distribution is a material requirement for a business and IT transformation.

CAPEX in distribution is related to setting up and maintaining the physical distribution, so reduc-

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<sup>6</sup> MVNO = Mobile Virtual Network Operator, typically a company that serves retail customers without own network.

tion here requires reduction of the footprint, similarly to the OPEX reduction.

### Summary

In summary, having examined the major cost areas, there are two changes that makes substantial difference: addressing network OPEX and CAPEX through smart RAN investments and network sharing, and the type of transformation outlined in this document, over time addressing distribution, process and IT cost.

## 2.2 Revenue perspective

While this document maintains a sceptical stance towards expecting revenue increase to resolve the challenges facing MNOs, the ability to maintain or increase revenue is, of course, a major concern.

As noted above, a significant amount of effort is dedicated to the distribution. To increase the effectiveness, in a combination of decreasing the spend and increasing the volume, a transformation must address the ability to innovate in the distribution. The actual innovation will be situation specific, but should at least include:

- Ability to integrate new services, including OTT services produced in a different value chain.
- Ability to work extensively with partners, both as a wholesale vendors and a wholesale purchaser.
- Ability to deliver all interaction digitally through various platforms.

All of this requires significant flexibility in distribution.

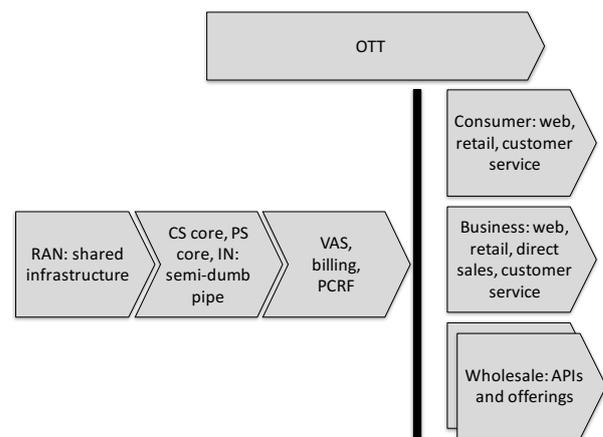
## 2.3 Value chain perspective

Value chain integration points shift over time. Modular value chains have the advantage of better optimizing each part whereas the integrated value chain can optimize the whole with higher resulting complexity. The computer industry, for illustration, with Apple as a notable exception, has overall moved towards more and more modular structures.

The MNO value chain falls into a number of distinct areas, as illustrated below. Most MNOs operate the entire value chain in an integrated manner. The assumption lying implicitly under such integrated operation of the value chain is that optimization across RAN, core, billing, customer service and distribution is worth the complexity. This view is currently being challenged, most notably through outsourcing. The point of view in this document is that the modular view of the value

chain with advantage can be considered beyond outsourcing. Optimizing the individual parts, as they are quite different in their requirements, is a lot easier than optimizing the whole with the MNVO for B2C as the most prominent example. And the interface in activating customers, price plans and getting network data for analysis, which is used for permitting MVNOs, is quite straightforward.

The considerations above lead to the view that the future value chain of the MNO gradually will be disaggregated to something like the following:



This illustration represents a view of the value chain with the following key characteristics.

The RAN is shared with other MNOs and somehow managed in a manner that provides sufficient scale.

The traditional core of the MNO, the CS/PS core, IN, VAS and billing are part of a “semi dumb pipe”, where cost focus is paramount. This reflects the view that substantial differentiation in this area is impossible, with the possible exception of a few, relatively narrow, B2B segments.

The distribution has a number of potential variations. Consumer and business illustrate the continued distribution in the MNOs primary brand(s), whereas wholesale represents the ability to do MVNOs, externally or internally. All of which has the purpose of ensuring sufficient traffic in the network. In addition to requiring flexibility as illustrated, it is likely that the weight will shift significantly over time, c.f. the discussion above.

OTT is a separate value chain, integrated via APIs, and provided internally (probably by a separate unit within the Telecom Group the MNO is part of), and/or via partnering.

In summary, this high-level “modularization” of the value chain into distinct domains is the proper

structural foundation for a transformation of business and IT.

### **3 Business transformation**

The consideration logically following understanding of industry trends is business transformation. This section outlines a process for such transformation. The purpose is not to provide a comprehensive guide, but to highlight aspects specific to the type of transformation contemplated here, as well as a few common pitfalls.

#### **3.1 Focus on simplicity**

Simplicity cannot be emphasized sufficiently; empirical evidence shows that length of operation and simplicity of product are the only significant explanatory factors impacting IT costs. While not directly documented in benchmarks, it appears obvious that complexity in IT and complexity in business is a vicious circle. Complex business requirements drives complex IT systems; which drives long development times; which causes short term solutions that tend to live very long; which causes process faults and manual workarounds.

The agenda of simplicity should therefore focus on making things simple and keeping them simple. Business transformation, therefore, also involves a governance of IT that can facilitate this.

#### **3.2 Start from scratch**

In order to make sure that all current customers are served with relevant products, one need to look at the current products. However, if one starts with current products and processes one gets stuck in current functionality and complexity.

So in order to achieve simplicity, the input should be the main segments, products in the market serving those in order to derive the products to offer in the future. In other words, a process like one would do in a new company.

Once this has been developed over a number of iterations, the current product portfolio can be used to check if there are important features or whole products that have been left out.

#### **3.3 Start with the hard parts**

While transformations of the kind contemplated here are not commonplace and few, if any, have been executed to a point where one may reasonably call them successful (ignoring corporate spin), many suffer from one universal mistake: they start

with “simple B2C” as a basis for the future system stack.

There are two problems associated with this approach. Firstly, building a business model of products, processes, capabilities and platforms to serve the simple problem will almost invariably fail to accommodate the complex problem. And if the “simple B2C” problem needs to be solved quickly, there are platforms that can be deployed in weeks and integrate via wholesale platforms. So if one is in a hurry to demonstrate results, a better way is to jump-start this and accept that the systems deployed for “quick wins” may not live for all that long (or become one of several distribution channels with a more narrow focus).

To get a robust platform, it is important to start with the difficult customers; the large accounts and public accounts who have IN and converged products; hierarchical and split billing with specific formatting requirements; extensive self-service portals; special hand set rules which must be observed in the physical distribution; and so on.

Also, the prevalent mental image in most employees of an MNO is the “no frill B2C” customer, which makes it double dangerous to start with that as many project members will not have an intuitive understanding of the real complexity.

#### **3.4 Understand value creation of IT**

Coming down to essentials, IT systems are put in place to automate a process in the business for efficiency, decision making, self service etc. And the process serves a purpose related to business goals, which is why the IT systems make sense in the first place.

More specifically, the value creation spectrum ranges from raw automation over differentiation through efficiency of use to differentiation in understanding and interacting with the customer.

An example of raw automation is mediation<sup>7</sup>. No customer ever sees it, but it must be in place as an interface between the network and the billing platform. And due to the volumes, there is no practical manual alternative.

An example of differentiation through efficiency of use is in customer service. Where a set of standard systems may suffice from a purely functional point of view, the efficiency gains from shorter call time, fewer errors that cause repeated calls may merit a more complicated and costly IT system.

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<sup>7</sup> Mediation refers to the process of collecting, reformatting and aggregating information from the core network elements to make them ready for processing in billing etc.

An example of differentiation via the customer interaction is the web. Having high quality self service in terms of “visual friendliness”, ease of use, quality of processes etc. can make significant difference in the customer perception.

The value of IT should be linked to the places in the value chain that are differentiating, i.e. the places the customers see and value. In some areas like billing, flexible systems are available that makes this easy. In other areas, compromise on the use of standard systems may need to be made.

In addition to having impact on the system choices and architecture, the view on IT value has impact on the operating model: pure efficiency through use of standard systems is a more obvious outsourcing candidate than the differentiating web channel.

Discussing and making this understanding explicit as part of the transformation formulation is important as it will help guide the subsequent project in selecting both systems, customization levels and operating model.

Furthermore, if combined a priori with explicit accepted cost levels and put as requirements to the projects, it also gives a foundation for managing the future cost levels of IT in absolute terms. Obviously, most projects have a very explicit relationship to the implementation costs, but the subsequent costs are often managed with a lot less rigor.

### **3.5 It is a two way street**

Laying the foundation for business transformation and simplicity is a separate piece of work as one needs to design a new business.

However, a key to simplicity is to use standard systems. Such systems come with version 20+ of data models and process support with input from a large number of implementations. There is no way a similar quality can be achieved in a design made from scratch since the required experience cannot realistically be brought to bear in a specific project. For a standard system, the value deteriorates quickly if extensive customizations are made: the ability to follow the upgrade path, utilize new features and avoid own development will be lost.

It is therefore essential to adapt to the abilities to standard systems, unless the value creation of not doing so is clear and the consequences in terms of cost, operating model etc., is understood and accepted.

Furthermore, the requirements specified in the initial phase of business transformation should recognize

this fact and try to keep a fairly high level of abstraction as well as focusing on differentiating requirements; for instance, the ability to rate and SMS or produce a basic bill is not likely to be missing in any system today, whereas hierarchical split billing handling the relevant tax quirks may not be standard.

One reason that the approach outlined here advocates starting from scratch is to facilitate this two-way thinking: define the products with which to serve the customers and use that, rather than existing functionality, as the starting point. And in doing so, bear in mind that product is a lot more than raw telecom functionality and price. Product is also how the customer experience the processes (and, implicitly, data), e.g. through flexibility and usability of self service.

In the approach outlined towards the end of this document, the two-way street view becomes very explicit.

### **3.6 Recognize flexibility requirements**

While simplicity is important, it must be kept in perspective; the end goal is to serve relevant customer segments. If a tender is received that can shift market share visibly, specifying a mandatory bill format, which requires a tweak to the billing system, then the billing system will be tweaked.

This observation has three implications:

1. Flexibility must be in place where it matters, particularly in the customer facing parts of the systems.
2. Care must be taken to specify the flexibility requirements as differentiating requirements.
3. A robust IT governance must be put in place in order to secure that only crucial changes are implemented this way and the resulting technical debt is kept under control.

### **3.7 Staffing**

It may appear odd to single out staffing at this level of discussion. However, staffing the business side of major projects is, almost invariably a challenge in major transformation projects. For an approach as outlined above, the issue becomes paramount. Focus here is on the business staff; that does not mean that IT is irrelevant, but typically IT staff is organized to work in projects, making it easier to allocate them.

As discussed above, the approach outlined in this document attempts to define a “new operation”. This entails a very large number of micro-decisions on what are acceptable compromises to

support the chosen segments. These decisions will have significant impact on the enterprise value following the transformation as it may shift market share and revenues by magnitudes beyond normal evolutionary development of business.

Therefore, the requirements cannot be specified and approved in “steering group approval” style, as is the normal mode of involving senior decision makers. It requires that these senior decision makers are directly involved in these micro-decisions; if not CxO level, then experienced people just below that layer.

Freeing up such people from daily operation is generally impossible. They are invariably indispensable in order to delivering the results in the next few quarters.

One potential solution to this is to strengthen these line organisations several months before the project is to start, so that the senior people in effect has been “replaced” and can be freed up for the project.

## 4 IT transformation

Similar to the section on business transformation, the purpose of this document is not to provide a comprehensive guide to IT transformation; the purpose of this section is to highlight certain considerations which fall into one of two categories:

1. They are neglected in many projects, causing significant challenges *or*
2. They are chosen as “mantras” or predefined beliefs without considering the circumstances under which they may be applicable.

### 4.1 Empirical findings

For most large scale IT projects, the project itself is executed professionally; employing proven best practices in methodology, sourcing, architecture etc.

However, at a macro level, few projects contemplate what works across the industry. Empirical studies have shown that the factors explaining IT cost are length of operation and level of prepaid customers. Which translates to simplicity: over time, the legacy grows, and with postpaid the scope for complexity is increased by orders of magnitude from the traditional simple prepaid.

Conspicuously absent from factors with strong empirical explanatory power are two factors that conventional wisdom takes as key to reducing IT cost: outsourcing and cross-border synergies.

This does not imply that simplicity is not all there is to it; nor that outsourcing and cross-border synergies are bad ideas. It does, however, imply that one has to look one level deeper to understand the circumstances where the tools work and where they do not.

As an example of this, outsourcing systematically reduces costs only if it is accompanied by the use of standard systems. Which is quite logical as standardisation enables scale within the vendor.

### 4.2 Use of standard systems

No one disagrees that the use of standard systems is beneficial. However, the term is not always well understood, nor is there a discussion under which circumstances standard systems are beneficial. This section attempts to classify systems and discuss under which circumstances they are appropriate.

#### 4.2.1 Taxonomy of “standard”

The promise of standard systems is that they provide a rich functionality with high quality at a fraction of the cost that a similar custom system would require. Furthermore, they come in new versions that give new functionality in line with the “best practices” of the business. Now, all that is nice. But far from all systems that term themselves “standard” conform to the strictest definition.

In this section, specific versions of specific systems are used as examples. This is not to recommend or criticize specific systems. The use of specific versions is simply to illustrate some points.

The *pure standard system* has the following characteristics:

1. The functionality it provides is well documented.
2. The functionality executes real business processes; a billing system is a standard system in this sense, but a database system or content management system is not.
3. It has regular updates in the form of releases with release notes, explaining what the upgrade is and how it is applied.
4. It has firm rules for what is *permissible customizations*, i.e. changes or configurations that may be applied without losing the advantage of being able to upgrade using vendor-supplied scripts and basic verification only.
5. The system is constructed in such a manner that the advantages of the system may be obtained in real-life operations within the limits of permissible customizations.

6. The vendor is willing to put the above in a binding contract.

Surprisingly few systems comply with this strict definition; the Geneva billing system used to (and may still do in its current incarnation) – the actual billing was high configurable and access was via APIs. Importantly, it was not possible to modify the system itself. Salesforce has some of the same characteristics in that it permits customization but automatically controls whether the customizations are permitted.

The *modifiable standard system* is a lot more common. It has all the characteristics of the pure standard system, except 4 and/or 5. Siebel is an example of a system that falls into – or at least used to fall into – this category; it was very seldom used without quite massive modification and it therefore became very hard to upgrade, resulting in a process that effectively is a fresh implementation.

The next level is the *standard framework*, which essentially is a starting point of functional modules and patterns that can be used to create an individual new system; once created it will be custom. These comply only with (2) and sometimes (1) in the list above. Earlier versions of Amdocs were in this category.

Finally, there are various *standard tools*, which provide a lot of basic functionality, but not system functionality as such. They generally do not comply with criterion (2) above, but do comply with the rest. These are not typically controversial, but are the foundation on which standard or custom systems are built.

#### 4.2.2 Applicability of the types of systems

While the pure standard systems and the standard framework are the “cleanest”, it does not imply that the other types have no value. Often, one gets lots of functionality that would otherwise have to be developed. On the other hand, if there is not sufficient functionality in systems of these categories or they are hard to integrate, they can end up being a poor and expensive environment for custom development.

Moreover, the use of systems that are not pure standard have serious impact on sourcing options if they are modified substantially as the scale advantage potential in sourcing of standard systems is reduced significantly.

Therefore, the pure standard systems should be used as much as possible, and one should attempt to adapt the business processes to these systems. This is easiest in the business areas on the left hand side in the value chain illustration.

The modifiable standard system is also a valid option, provided the customization can be kept at a manageable level. This should be assessed as part of the selection, and also for these systems, one should earnestly attempt to adapt oneself to the system instead of the other way around.

The standard framework is essentially a custom system, and must be used with care; if it does not fit in the overall architecture, it can be costly to modify and maintain.

#### 4.2.3 Governance

A quite frequent experience with a certain category of business leaders is this: they can literally go from one meeting where they complain bitterly over the sorry state of the IT architecture and wonder why “IT cannot simply use standard systems” to another where they refuse to modify even simple processes and rules to what the systems can already do or insist on a “quick fix” that will make things even worse. Similarly, many business cases involving IT development ignores the resulting increase in operation and maintenance cost, in spite of all experience showing this to be 10-50% yearly.

The point of this is not that the systems should decide over business. But it is a very real business problem if the understanding of the long-term consequences of decisions impacting the IT architecture is understood insufficiently at the executive level. There is clearly no easy fix for this; often it is very hard to articulate the long-term consequences, and setting monetary value on it is almost impossible.

While not being a full resolution to the issue of maintaining the architecture, and limiting the technical debt, it is necessary to have a firm governance. This governance must be based on guidelines that are explicit on the value creation of IT and resulting flexibility in terms of standard vs. non-standard as well as on the consequence on operating model. This governance should include a requirement to obtain approval for exceptions at a very senior management level.

### 4.3 **Sourcing**

The typical rationale for outsourcing is cost saving; it may be disguised as “focus on customer” or “someone who does this all the time must be better than we at it”, but cost saving is usually at the heart of it. However, even for high-wage countries, in-house staff combined with moderate staff augmentation can have lower average rate than an outsourcing system integrator, even using aggressive labour arbitrage.

Related to this issue is that IT development is notoriously difficult to measure in terms of output. In consequence of this, comparisons focus on cost of input instead, typically hourly rates. There is a lot to be said in favour of focus on reducing hourly rates, but they are far from telling the whole story. For instance, the productivity of a closely-knit group interacting with their customers can easily be ten-fold higher per hour than a heavy-weight team distanced from the customer, so even if the input cost (hours) were cheaper, it does not necessarily follow that the overall efficiency becomes higher. This fact is at the heart of “agile” methods.

One might expect scale advantages to outweigh this difference in productivity. But such is not the case since almost all IT environments in the Telecom Industry are highly customized with the complexity residing in the business understanding and the specific structure of the system, and therefore the synergies of scale are marginal.

The logic here is supported by empirical evidence: only in situations where the IT stack is highly standardized, does sourcing have significant positive impact on the cost position.

This said, there are obviously many situations where outsourcing of IT development makes sense, including taking advantage of labour arbitrage. But one needs to look deeper than the price of an hour of programming.

In addition, outsourcing is relevant in two areas:

- Maintaining existing systems: it is a lot easier for a system integrator to handle the HR issues of maintaining a dying system than it is with in-house staff.
- Executing the transformation: these are skills that typically are not available with in-house staff of an MNO.

Irrespective of the sourcing model, it is important it is important that the migration approach includes consideration on how the projects are migrated into the target operating model.

#### **4.4 Cross border synergies**

The discussion of cross-border synergies is similar to IT outsourcing in that it has an appealing logic (“why do we want to maintain X system stacks when we can make do with one”), which implicitly assumes a context of commonality that is typically not present. Furthermore, also similar to outsourcing, it is not supported by empirical evidence: scale in itself has limited value.

Again looking at the next level, this is not really strange. In most situations, the governance of products and processes is decentralized and the

requirements to IT are therefore not co-ordinated; and not infrequently there are real market differences, especially for large operator groups with operations in very different geographies. Centralizing the IT people servicing a number of different environments does not give significant scale advantages.

Only in situations similar to where outsourcing makes sense can cross-border synergies provide significant advantages: with high degree of similarity through use of standard systems or centralization of governance of requirements, are there significant advantages of having joint systems across borders. For this reason, the back-end systems like billing, mediation and rating are easier to obtain cross-border synergies for than customer facing systems like the web front-end.

The question of cross-border synergies is the topic of another white paper available on the web page set out at the end of this document.

#### **4.5 Best of suite versus best of breed**

This specific discussion is often a heated one, and the purpose here is not to try to resolve it as both models can work in the context of the approach proposed here. Rather, the purpose is to make a couple of points in the context of the structural direction outlined in this document that do provide some guidance pertinent to this topic. The value chain perspective introduces modularity in the value chain and this principle is important to reduce complexity as well as permit innovation in distribution. It is therefore imperative that these boundaries are respected in the IT stack.

This is most obvious for OSS, which will follow the outsourcing or consolidation of the operation of the networks. But it is also important for distribution, where structural and general flexibility is required to support the necessary innovation.

This type of disaggregation may be a challenge for the “suite” vendors as they generally solve all problems in one integrated system. So going for an integrated suite, which has many obvious advantages, must, assuming one buys into the view of the value chain disaggregation, adhere rigidly to this value chain modularity.

#### **4.6 Greenfield vs. brownfield**

A “greenfield” approach is to replace – more or less – the entire system stack in one go, whereas a “brownfield” approach replaces the systems in smaller chunks.

The point of view in this document as that in the context of radical simplification, the only real op-

tion is the “greenfield” approach. Consider for illustration replacement of the billing system in a system stack. If existing products are to be supported, the new billing system must have all those products implemented, which means that it will inherit much of the existing complexity. If, on the other hand, only new simpler products are put into the billing system, either the customers would have to be force migrated or the old billing system would have to be kept in parallel, with the level of interface complexity that entails.

A variation of the greenfield approach is to implement multiple new “microstacks” focused on individual customer segments, e.g. introduced with new price plans. This approach has several appealing features: it provides for quick time to market, the old systems can remain untouched and it permits experimentation. Therefore, it can make sense, but it should be part of a larger plan. Otherwise the maintenance burden will be a real risk.

#### 4.7 Migration approach

Assuming the greenfield approach from a system perspective, one has to consider the the migration approach. In the most extreme scenario, a new system stack is build alongside the existing and all customers migrated to the new system stack in a “big bang” approach. This is an extremely high-risk approach, both from a technical and a business perspective. Rather, the migration should be gradual, even if that requires a level of integration with the legacy systems (on CDRs<sup>8</sup>, number porting and the outermost layers of web and distribution support). This gradual approach has a number of advantages:

- The functional and technical issues that invariably are part of a new system stack can be addressed without impacting the majority of the customer base.
- It is easier to limit the legacy requirements, as the legacy stack continues alongside the new.

These are of a risk-reducing magnitude that they are sufficient argument for the approach.

As new products go into the new stack, the customer can be guided to the right stack in the touch points, making the integration effort manageable and certainly less than alternative risk reducing efforts.

However, another discussion is on the duration of the migration, illustrated below.

	Fast migration	Slow migration
Pro	Limits cost of dual systems	System and churn risk reduction Complexity of systems not driven by old products
Con	Risk of instability Risk of churn due to forced migration of customers Pressure to increase scope.	Dual system stack Migration time may exceed CxO tenure

Selecting the migration tempo will depend primarily on the business risk, e.g. churn from force migration. The technical risks, system stability, faults etc., can be handled in a relatively short migration timeframe.

#### 4.8 The specification trap

The “specification trap” refers to a key issue related to the process of transformation. The “old fashioned” development approach is to write a requirement specification and tender it to vendors (or develop it internally). This has the obvious advantage of securing firm contract basis, but experience shows that the magnitude of such a specification is such that it is invariable inaccurate and certainly obsolete when implementation is half way through. And it is unlikely to result in extensive use of standard systems.

More “modern” methods emphasize the gradual development of requirements, with the more extreme models not having any real specification at all. While this may be viable for smaller projects, the predictability and contractual control (in case of external vendor being primary responsible) for large-scale projects is problematic. In part, the buyer may be able to solve this by pushing risk onto the vendor. However, in an “anything goes” contract, such gradual development, even if starting out with one or more standard systems as the backbone of the stack, carries the risk of being too influenced by existing functionality at the cost of utilizing standard systems. And at the end of the day, the vendor also needs to make reasonable profits from the relationship for it to be fruitful.

A transformation approach should avoid these extremes while ensuring simplicity and the maximum utilization of standard systems. Looking at the practice across industries it is clear that this is not trivial to achieve. The approach outlined in section 5 below is an attempt to reduce this issue.

<sup>8</sup> CDR = Call Detail Record, the individual record describing an individual call.

## 4.9 Structural flexibility

The term “structural flexibility” has appeared a number of times in the document so far. The business perspective is the need to be able to adapt to changes in the interface points of the value chain and to substantial changes within each part of the value chain.

Specifically in the analysis above, the interfaces identified are:

- RAN towards CS/PS core.
- CS/PS core towards billing etc.
- Billing etc. as the interface towards the general backend from the distribution channels.
- OTT

In addition, the need to be able to take an explorative stance with respect to how the distribution develops must be observed.

From an IT perspective this translates to the following requirements:

- Systems cannot cross the value chain interfaces; the IT modularity must respect the business modularity.
- It must be possible to experiment with lightweight approaches in distribution, e.g. MVNO type processes, outsourced models etc.

These should be elaborated to be included in the differentiating requirements of the overall approach.

## 4.10 The dilemma of tier-1 systems

Part of the standard sourcing process of selecting system is to produce a gross list of system vendors that may be selectable and through a more or less formal process gradually reduce the list to a single vendor. This process is fine, and to get proper prices as well as proper terms and conditions, it is often necessary.

A common approach for defining the gross list is taking the analyst reports, typically Gartner Group or similar, and go for the “leaders”. Assuming that the analyst has got it right – or at least not all wrong – this has obvious advantages. It is neat and structured, gives a nice starting point of typically 3-8 systems, and it is defensible in case of second-guessing when the project becomes challenged, as IT projects from time to time invariably do.

Unfortunately, the process also results in ruling out all but tier-1 systems. The tier-1 systems are characterized by very rich functionality, but also by high prices and high complexity. Very significant amounts of time will be required to learn, truly understand and configure the systems, or al-

ternatively get specialists from the vendor or system integrator, frequently at high costs. Which boils down to that they are expensive to buy, to install and to maintain.

This issue is amplified by the fact that lower-tier systems are evolving and becoming adequate, even for quite complicated process support.

The sourcing process obviously can accommodate more systems, including lower tier systems. The issue is that there are so many possibilities and really no structured way of finding the right selection for the gross list. And even the best architects or consultants cannot know the full possible list to the relevant level of detail.

The consequence is that include systems below tier-1, the process will have an element of randomness to it. It will be necessary to accept that the gross list of systems will be highly influenced by the personal experiences of the team involved. Furthermore, that it is not repeatable in the sense that a redo of the process will provide a different gross list.

For many large organisations, such randomness and lack of repeatability is difficult to handle. This may be related to the fact that large organisations tend to become risk-adverse, which drives them towards a predictable process, using well-known industry references. The old adage of “one does not get fired for selecting IBM” is, while not necessarily true anymore, analogous to this.

So this is the dilemma: restrict the process to tier-1 systems or accept a less structured, less predictable process.

Firstly, it is important to make this a conscious choice, not one of organisational default. This way at least it is possible to take a hard look at whether restricting to tier-1 systems is the right choice for the particular project. And if not, include selected tier-2 or tier-3 systems, accepting the less structured process leading to this list.

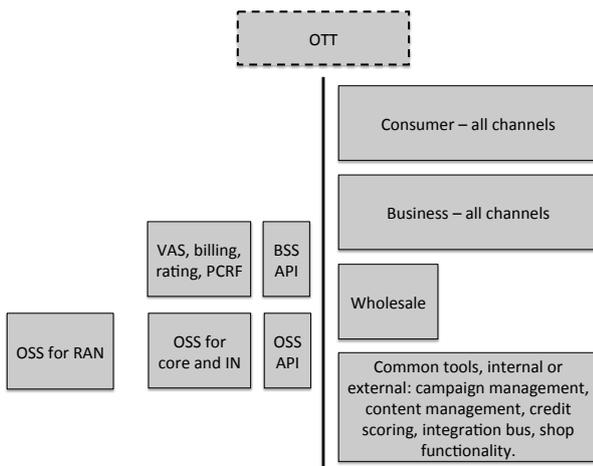
Secondly, one must recognize that having a token tier-2 or tier-3 system in the gross list does not change the process. This can happen to get price pressure, but as the tier-2 systems often have very different scope and breadth, a single tier-2 system will almost certainly be eliminated early in the process. Instead, the process must be designed to permit a real choice from a functional coverage and total cost of ownership perspective.

In summary, this is a choice of approach, and unless one is will to accept using solely tier-1 systems, the choice of gross list will have to be less systematic.

#### 4.11 Suggested architecture

For purposes of illustration and inspiration, this section outlines a high-level technical architecture that would respond to the requirements listed in this document.

The solution is strictly linked to the value chain disaggregation, as the key interfaces of the value chain is also present in the technical architecture and corresponding organisation and sourcing. As will be seen, the value chain interfaces can permit simpler solutions in each area as the criteria for optimization then are clearer.



These are briefly discussed in the following.

OSS is not the primary topic of this document, and as it will typically follow outsourcing or cross border operation of the network (where the gains are a lot more straightforward than for IT). However, the data from the network and core must be made available for the customer facing elements: customer quality experience, usage for CAPEX allocation discussions etc.

VAS, billing, rating, PCRF etc. are the typical central elements. They are characterized by high level of maturity, availability of pure standard systems (c.f. definition above) and comparatively predictable requirements. These areas are the ones that lends themselves well to the traditional measures: outsourcing, cross border synergies, traditional IT processes etc.

OTT is set outside the main bulk of the systems as any OTT services should be considered an “external” partner and integrated via APIs, not in the core systems, with processes supported in the OTT stack.

Common tools are functional or technical components that are relevant for most or all the customer facing subsystems. In case such tools are put in place, they need to be set up with clear interfaces

and governance in order to avoid the whole distribution support system to become monolithic.

Wholesale is the interface and set of tools that permit interface with MVNOs. In its basic form, this is not a very complicated system as it mostly uses the interfaces provided by the BSS and OSS APIs. However, opportunities may exist in this area by providing “telecom in a box” solutions that go beyond the traditional no-frill MVNO. Resolving the cost of distribution in B2B may in part be achieved by enlisting wholesale partners through more advanced wholesale interfaces.

Consumer is the subsystem that serves B2C customers. With small extensions, particularly for physical distribution, there are lightweight solutions (modifiable standard systems typically, but also hosted solutions) that can be deployed very quickly, supporting MVNO-like functionality.

For consumer, and wholesale, one might consider the use of the common tools and/or such modifiable standard systems joined together with an integration bus by an in-house team employing agile methods. In essence, an IT department for consumer, potentially served by a common group for the common tools.

Business is the subsystem that serves B2B customers. This is the most complicated area, as it is complex from a data structure and process perspective and pure standard systems are not readily available.

Here the solution for the front-end will depend on the specific complexity which needs to be understood: can a model similarly to B2C function or must a standard system that is not pure be employed in combination with more traditional measures like outsourcing and traditional IT methods. One can also consider a structure similar to B2C as outlined above.

Cross-border synergies and outsourcing are, in this suggested solution, relevant on the left side of the vertical line, but less so on the right unless high levels of commonality exists, e.g. through joint product management.

## 5 Approach

This section discusses a potential approach, first setting out the requirements to the process and then describing the process itself.

In the same way as for the previous sections, this is not a comprehensive description of the approach. It is a high-level process description where many of the elements will need to be filled

out, and the focus again is on where the “normal” processes typically are different.

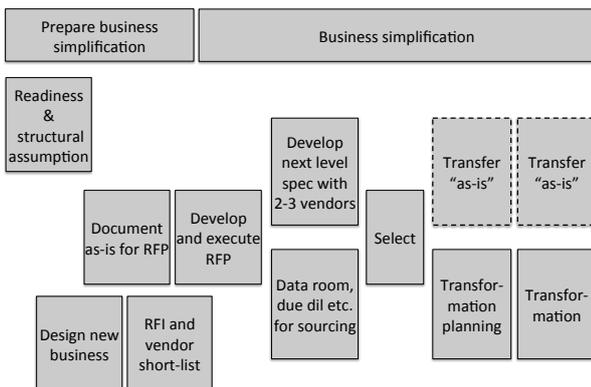
### 5.1 Requirements to the approach

In order to secure that the suggested approach addresses the issues outlined in this document, the following summarizes important requirements for an approach, identified based on the discussions above.

- The transformation should embed structural requirements as the foundation to promote simplicity and structural flexibility. The structural direction may not be as illustrated above, but the discussion should take place and be a key foundation for the project.
- The process should be designed to ensure business and system simplification, c.f. description in the business transformation section.
- The process should be designed to maximize the use of standard systems.
- The process should utilize sourcing as described in the IT transformation and suggested solution sections.
- Sufficient and qualified staffing should be in place as described in the business transformation section.
- A “greenfield” approach with gradual migration should be used.
- The specification trap should be avoided.

### 5.2 Process

The illustration below outlines an approach that addresses the requirements listed above.



The individual steps are as follows:

Readiness and structural assumptions. This part sets the foundation for the project in two ways. Firstly, it should assess the readiness for a transformation journey as the one described here. It is not easy going and requires a true “burning plat-

form” and heartfelt commitment from the business side. If it becomes “just an IT project”, it will not succeed. Secondly, it should set the assumptions on business evolution, value chain support and disaggregation, flexibility and innovation requirements, particularly in distribution as well as the value of IT and expected future cost bracket. In short, the specific version of the topics outlined at the start of this document.

Prepare business simplification. This contains preparation of staffing as well as traditional information gathering such as process and product overview, mapping of products to segments etc.

Design new business. As described under “business transformation” in section 3.2, the suggestion is to define the business from scratch, as a new company would do, utilizing current products and processes for control towards the end. This involves primarily defining the market offering, distribution and building a business case for the new model. Hypothesis for the approach for feedback and learning in case the results do not match expectations should also be included.

Defining the new business also includes defining hypothesis for organisation and sourcing after transformation, as the execution of the transformation will vary depending upon the target operating model.

Document ‘as-is’ for RFP. This step assumes that some sort of sourcing process for existing systems will be run in parallel with the replacement. The reason this is a likely option is that, irrespective of whether existing systems are managed internally or externally, the old system stack will die, and that is easier to handle through outsourcing. Also, it will be the joint support from the new and existing systems that handles the business, and the interaction and stability will be better with a single vendor. However, if an existing vendor exists on IT AD/AM where the relationship is good who can handle the decline in business in a constructive manner, this can be skipped.

RFI and shortlisting. This takes the structural assumptions and the designs of the new business to vendors for a feel for the options. Both system integrators and system vendors can be considered and in this phase, both should be included unless special circumstances mandate differently.

An important point to ensure simplicity and reduction of IT cost is to include vendors beyond the usual ones from the “leaders” of the analysis, c.f. section 4.10 for further discussion of this topic.

Develop and execute RFP. This takes the sourcing part (if relevant) and the requirements, and asks

SIs to suggest a set of systems and a transformation approach within the process set out here.

An important part of the RFP is the end-state of the operating model as the transformation will have to build that as well. The operating model is discussed at a high level in the section “suggested solution: technical architecture and organisation”.

Suite vendors can be included both as system vendors and as SIs, but due to their intimate familiarity and obvious preference for own systems, they may as well be invited jointly with their package.

Develop next level spec with 2-3 vendors. Following the responses to the RFP, 2-3 vendors are selected for the next phase. These are invited to execute a set of “conference room pilots”, going through relevant use cases from the distinguishing requirements and documenting how the proposed systems stack can support these requirements. A few additional points on this process:

- The process would be two-way, looking at requirements but also system possibilities, with emphasis on the latter.
- As the use cases are elaborated, the fulfilment is documented in order to become part of a future contract.

This process is similar to an “architects competition” and in cases where the expected implementation cost is low, it may be necessary to pay vendors for the participation in order to get sufficient attention and quality.

Data room, due dil etc. This is relevant in case outsourcing of AD/AM is relevant in the process.

Selection. Based on the process so far, a single vendor is selected.

Transfer ‘as-is’. In case sourcing is part of the scope, the transfer of existing system can take place either before or after the transformation planning is complete.

Transformation planning. In this phase, a more “traditional” contract is developed from the work performed in the “develop next level spec”; ultimately, it is still a vendor relationship and a contract is needed to manage it.

The phase represents a risk of falling back into the specification trap, not reducing simplicity etc., so it needs to be governed carefully, preferably keeping specifications at the product and customer view of process level.

The approach will also vary considerable, depending upon the chosen organisation. In case the suggestion of an in-house agile IT organisation coupled directly to the market divisions is followed,

c.f. section 4.3, systems developed for this part of the value chain will be handled very different from systems that are managed in a more traditional – and probably outsourced as they will be more standard - manner.

Special care must be taken to define the intermediate steps, i.e. the phase between current status and the end-state as this situation will exist for an extended period of time.

Transformation is the execution of the installation of and migration to the new systems and new organisation.

Business simplification is the execution of a simplification of the business. This makes sense to do as soon as possible; if, for instance, all products sold a year before migration conforms to the new systems, the migration period will be correspondingly shorter and less painful.

## 6 Organisation

The question of organisation has been touched upon in several places throughout the document. This section gathers the various points and looks at both the organisation of a transformation project and the subsequent line organisation.

### 6.1 Start with the end in mind

Although the project organisation comes before the line organisation in time, it is necessary to understand the desired structure of the organisation following the project. The wider concept of what might be called the operating model for the new IT stack should be considered. The main reason for this is the following: the transformation program not only builds IT system, defines business processes etc., it also builds skills and supporting processes. And understanding which skills are required for the operating model is important before defining roles in the transformation program.

The reason a new operating model probably is required is that a transformation, as contemplated in this document, is unlikely to leave the supporting organisation unchanged.

The operating model should consider at least the following areas:

- Sourcing, i.e. which parts to do internally and externally, which sourcing packages are required etc.
- Development approach for the various parts of the application.
- Governance, e.g. how projects are decided, architecture control. For cross-border projects, this in particular requires significant effort.

- Operation of the IT stack.

As indicated in the previous text, the back-end parts on the left-hand side of the primary break in the value chain is likely to consist of integration of standard systems executing the heavy transactions of the on-going business. Therefore it is most appropriately supported by traditional IT methods with high focus on risk management. It also lends itself well to use across borders and, as it is standard, it is an obvious candidate for sourcing as the vendors can achieve economy of scale.

For the front-end parts, that are less likely to be pure standard, and are closer to the customer, the situation is opposite. Scale advantages are less likely to be present, so outsourcing is less obvious. Furthermore, the closeness to the customer facing units is important. Therefore, a small team, ten or less, close to or even organised as part of the market organisation, utilizing agile methods could be considered. Note that the architecture control and traditional IT risk management approaches may still be relevant for substantial portions of the front-end parts of the application also.

As part of the operating model it is important to understand which IT processes are managed internally vs. externally. Even in the most outsourced scenario, some architecture, testing and governance processes are required internally. If the operation is sourced to multiple vendors, the end-to-end handling of the ITIL processes will also need to be addressed. And if parts of development are managed internally, the IT development processes become part of the future setup.

This all adds up to a design, not directly of the organisation, but of the responsibilities and corresponding skills requirements.

## **6.2 Project organisation**

Following the discussion above, it is hopefully clear that both the potential internal management scope and required skills can vary quite substantially.

The project organisation needs to take this into account, as it towards the end of the project will transition into a line organisation. And if an external vendor has executed all IT processes, it is challenging to build the required skills internally following the conclusion of the project.

To illustrate the point, a couple of project organisation items are discussed here. They are specifically for illustration as they certainly do not constitute a comprehensive discussion of a transformation project organisation.

### **6.2.1 Project management**

Project or program management of large-scale transformations typically involves some external resources. In case such competence exists internally, it is typically with people in senior positions that cannot readily be made available for a transformation program. However, an effort should be made to attempt to secure internal staff if possible.

The role is closely linked with the risk management approach from the mandate and accountability of the project management. In case an external vendor is requested to take all the risk, the vendor will reasonably insist that the project management mandate is with him. Moving the entire risk to the vendor points towards subsequent outsourcing as the vendor typically will staff many if not all senior positions in the program.

If the approach discussed above of having the back-end outsourced and the front-end internally, the requirements for competence in managing the back-end are less important, and the risk of that part can be pushed to a vendor. However, as no party manages the complete stack, the risk will be split and in the end the MNO will own the overall risk. In this situation, the vendor can supply program management resources and support both the vendor work streams and the MNO work streams. In case the vendor delivers very substantial portions of the stack, this can make sense. In case many vendors are involved in delivering parts of the stack, it is less obvious as the vendor will be managing his own deliveries as well as other vendors.

A final option is to manage the project internally or with external project management staff that does not deliver parts of the new system. This has the advantage of not mixing the roles of a vendor as discussed above in a setting where several vendors or internal projects deliver parts of the project.

### **6.2.2 Testing**

In most cases, some internal validation will be necessary to permit control of the quality of new releases. This validation requires a test model and tools to monitor the execution of the test. The test model must be built in the transformation project and used for the first validation.

When setting up the test models it is therefore necessary to understand the future distribution of work and ensure that the project is capable of transitioning the test models, automated testing, test environment management etc., to the relevant entities, internally or externally.

## About the author



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