PROJECTS AND THEIR CHALLENGES FOR NEW PRODUCT DEVELOPMENT
IN THE TELECOMMUNICATIONS INDUSTRY

Dr Mustafa Kosaroglu
Macquarie Graduate School of Management, Sydney, NSW, Australia
Email: mustafa.kosaroglu@students.mq.edu.au

Dr Robert Alan Hunt
Macquarie Graduate School of Management, Sydney, NSW, Australia
Email: Bob.Hunt@mgsm.edu.au

Preferred stream: Stream 16: Technology, Quality and Operations Management

Profile: Mustafa Kosaroglu has a Ph.D. in Electronics Engineering, and an MBA degrees. He has worked as senior engineer for software and systems development in global telecommunications equipment manufacturing companies. He is currently employed as a Product Development and Project Manager at SingTel Optus. He is working towards a Doctor of Business Administration degree at Macquarie Graduate School of Management.
PROJECTS AND THEIR CHALLENGES FOR NEW PRODUCT DEVELOPMENT
IN THE TELECOMMUNICATIONS INDUSTRY

ABSTRACT

Bringing a stream of new products and new features into the market is one of the key strategies to beat the competition that has increasingly intensified since the de-regulations in the Telecommunications industry (called ‘Telco’ for short). There are only a few studies dedicated to New Product Development (NPD) in this hypercompetitive de-regulated industry today; our study investigates Telco NPD projects and their challenges. It has found there is no difference in terms of project challenges between the projects that develop consumer or business Telco products. Conventional project classification schemes have been examined and found not to provide clear insights. The analysis has resulted in the classification of the projects into small, and large and complex projects. The shortened technology cycles and competition in particular have been found to drive Telco companies to deliver successful NPD projects in a shorter time, and they need to ensure that their business processes support the technologies in new products without any disruption. This study highlights flexibility in applying project management processes as a major critical success factor that requires skillful and strong project managers to develop quality new products with challenging time-to-market goals.

Keywords: Project management, New product development, Telecommunications

The world-wide de-regulations in the Telecommunications industry (‘Telco’) have created a hypercompetitive market (Beardsley, Enriquez & Garcia 2004), in which the Telco companies have to bring an ever increasing stream of new products to market in order to survive and grow. The project manager is one of the NPD success factors (Cooper and Kleinschmidt 1996), and our bigger research study aims to fill a current knowledge gap: It investigates what differentiates successful project managers in this technology agile and competitive service industry. We have performed an extensive review on NPD projects and their management, and searched for Telco specific research in the literature (Hunt and Kosaroglu 2006) to develop a theoretical project manager skill set framework. Then, we tested it in a pilot study with a small group of project managers in an Australian Telco company (Kosaroglu and Hunt 2007). However, due to the limitations, it did not present a clear sufficiently detailed information about the projects.

In the study reported on here, we have presented the results from a completed step of the main research: the Telco NPD projects and their challenges from a larger population that includes a number of Australian Telco companies, involving project managers as well as other key project stakeholders. The revisions and analysis for relating them to the project manager skill sets are currently ongoing, and not addressed in this paper; they are introduced shortly below for information only. Our ultimate research goal and the connection of this paper to the whole research is mentioned here to indicate what we will do next with the findings here. First, we summarise our two previous papers (Hunt and Kosaroglu 2006) and (Kosaroglu and Hunt 2007) shortly, leading to the questions that this paper
covers. Next, the research methodology is explained. Then, an analysis of the sample Telco NPD projects is presented: firstly, with respect to the products; secondly, how the participants have described the project types; and thirdly, the classification of the projects for the challenges in their management. The details of these challenges and their impacts are presented, together with what Telco companies are doing to address key areas. Lastly, the outcomes are highlighted, and conclusions are drawn.

LITERATURE REVIEW: A SHORT SUMMARY OF ONGOING RESEARCH

Possession of certain skills is the foundation to claim competency in a profession. Several literatures mentioned skills for project managers, but they lacked a holistic view that provides an abstract and compact explanation in the NPD context. To address this gap, we have chosen the rationale of examining how a skill contributes to an NPD project management success to form the skill sets. The skills are intentionally separated and collected under the most distinctive and mutually exclusive sets for a simpler presentation. An extensive literature review developed a theoretical model with four skill sets: technical, leadership, managerial and administrative, as shown in Figure 1. It differs from other studies with clear definitions for the NPD context and groupings grounded in the recent literature on management and leadership (Hunt and Kosaroglu 2006). In simple terms, the overall analysis can be described as matching the challenges in Telco NPD projects against the skill sets required to overcome them. Therefore, the investigation of project challenges in the Telco NPD context is a key step towards testing and verifying the theoretical model.

Figure 1. Project manager skill set framework.

Considering the Telco industry assumed characteristics - dependency on new technologies and integration in practice and reliability of the services (i.e. products) - we have made theoretical deductions about the challenges for Telco NPD projects using five project classifications proposed in
the literature: project strategies (Griffin and Page 1996), innovation (Henderson and Clark 1990; Wheelright and Clark 1992), technology, product innovation and market (Balachandra and Friar 1997) and product complexity and technology (Shenhar 2001). However, they were not sufficient to explain the evidence that we encountered in the pilot study with project manager participants only. (Kosaroglu and Hunt 2007). The majority of the classifications were biased towards explaining the projects according to the radical versus incremental product innovation dimensions. However, we found more emphasis on technology, time-to-market and process implications. Following the main research over a larger population in this paper, we can present a complete answer to the question ‘what are the defining characteristics of Telco NPD projects, and their challenges’.

**RESEARCH METHODOLOGY: CASE STUDY WITH MULTIPLE CASES**

We aim to gain a better and deeper understanding of Telco NPD projects, but also to produce generalisable results across the Australian Telco industry, and therefore selected a case study research methodology (Yin 2003). Although it was convenient to implement a case study research with a single case (i.e. a Telco company or business unit), in which the researcher has easy access to collect data, it might be doubtful if the findings are applicable to the whole Australian Telco industry. The number of projects and participants from other cases are smaller or one only, but they are extremely useful for cross case comparisons and to reach generalisable conclusions. Five cases were developed covering all the major firms in the Australian Telco industry. One of the cases is not a service provider company, but they are heavily involved in Telco NPD projects. It is also included to test the results at boundary conditions.

One-on-one semi-structured individual interviews are used to collect data, which due to the subjectivity and confidentiality issues are seldom, if ever, recorded in any document. Macquarie University’s ethics approval was obtained, and its guidelines have been followed through the data collection, analysis, and presentation of the results. Each participant has at least five years of experience in NPD related roles. The participants (i.e. units of data collection) have provided rich data during 1 to 1.5 hour interviews. They consisted of project managers, managers of project managers, program managers, senior managers, and project sponsors in order to triangulate data both within and across the cases. About half of the participants have worked in more than one Telco company, and therefore they can directly make comparisons between cases. There were standard, and then open ended follow up questions about a number (3 to 5) of projects (i.e. units of data analysis). The interview protocol basically consisted of the following steps: 1) Obtaining the consent form; 2) explaining the purpose of the research briefly; 3) Learning participant’s attributes (experience, qualifications, roles, etc.); 4) Identifying a number (3 to 5) NPD projects and their characteristics (budget, size, duration, type, team size, benefit realisation, on time and and scope, etc.); 5) Examining each project one by one. The critical questions are: “Describe
the particular challenges that arose in each project.”, “In which phases of the project did they happen?”, “How did you (or the project manager) overcome them?”, or similar ones; 6) What and how tools and processes were used for project management; 7) Generalising over the projects, and comparing between cases; and 8) Any further comments or additional information. The strategy followed in the protocol, moving from specific projects to broader discussions over the cases had a positive effect. The participants recalled past events more strongly and made better generalisations and cross case comparisons.

The interview transcripts and the researcher’s notes taken during the interviews were analysed, and conclusions were drawn systematically, with an audit trail from the data for construct validity. As necessary, second short interviews were arranged on areas that needed clarification. The results were also evaluated with a number of knowledgeable and experienced project managers to check the validity of the results.

The key question in a qualitative research is to know when enough is enough. After the pilot study, extending the net to other project stakeholders and Telco companies has covered the research area quite well. With noticeable data saturation by the seventeenth interview, a further six participants were specifically selected to provide information about more than one case, for cross case examinations, and to check the consistency of the outcomes by deliberately proposing and hinting opposing arguments. In this study, we have observed the same behavior that Griffin and Hauser (1993) mentioned in their research that compared different data collection methods to understand the customer needs. They concluded that one-on-one interviews with 20 – 30 customers reveal 90% or more of the customer needs. The careful selection of four participants in the pilot study already revealed a significant amount of information. After a further thirteen in the main research, the additional new data per participant was negligible. Totally, 23 participants cited 84 projects, of which 12 were cited more than once. A summary comparative information among the five cases is provided in Table 1. Case 1 has the largest group, nevertheless the results are consistent for all cases.

Table 1. Comparison of cases: number of participants and projects contributing to each case.

<table>
<thead>
<tr>
<th>Case</th>
<th>Short Description</th>
<th>No of participants</th>
<th>No of projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>Large Telco company, subsidiary of a global Telco group</td>
<td>21</td>
<td>57</td>
</tr>
<tr>
<td>Case 2</td>
<td>Large Australian Telco company</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Case 3</td>
<td>A Telco business group</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Case 4</td>
<td>Large Telco company, subsidiary of a global Telco group.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Case 5</td>
<td>Australian branch of global Telco professional services supplier.</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
CLASSIFICATION OF NPD PROJECTS

We first examined the obvious two groupings of projects: developing new products that serve consumer and business market segments; and types that were commonly referred by the participants. Cost pressures are causing convergence of products regardless of the markets they serve, and there are significant overlaps among different project types that were defined by how a company responds to market demands. Therefore, we have not found any useful and unique differentiating relationships with their challenges in either groupings. Then, we examined the sample NPD projects for better indicators for their project management challenges. It resulted in classification with two project categories: small, and large and complex, as shown in Table 2, which was drafted tentatively in the pilot study (Kosaroglu and Hunt 2007) and refined later in the main research. When the sample projects in the pilot study and later in the main research were rated with the Crawford-Ishikura Factor Table for Evaluating Roles (CIFTER) (GAPPS 2006) complexity factors on a scale from 7 to 28, their differences again became very clear. The scoring of small projects range from 7 to 10, and large and complex projects between 20 and 25 points. According to Global Alliance for Project Performance Standards (GAPPS), the projects rated less than 12 CIFTER points cannot be used to evaluate project manager competency. One of the pilot study outcomes was, therefore, not to focus on small projects further in the main research, as they are not useful to examine the project challenges. Consequently, the majority of the sample projects (65 out of 72) are large and complex. There are no clear cut boundaries, but considering CIFTER ratings, they cost more than $1m, last more than 9 months, and have 10 or more stakeholders. It was also clear from the participants, when asked for the projects in which they had challenges, that they did not identify small projects.

Table 2. Comparison of large and complex versus small projects. Dark grey: new product development that involve technology projects, NPD with many stakeholders, light grey: small projects.
TELCO NPD PROJECT MANAGEMENT CHALLENGES

With the toughening competition in Telco industry, there has been a holistic shift in the way NPD is performed. Telco companies now have dedicated groups, management structure, and a more systematic approach for NPD. It is now treated as special projects with strict budget and time constraints; quality is no longer the only expected outcome. This section explores their contemporary management challenges as revealed in our study. The order of the presentation below neither implies the order of their importance, nor the frequency of occurrence in NPD projects; each project has its own particular conditions. They are the major challenges that fundamentally shape Telco NPD projects.

Technology: Telco equipment manufacturers extend their products frequently with new attractive functions to create new business opportunities. They make them known to everyone in the industry via advertisements in magazines, internet, etc., contributing to the competition between Telco companies. When Telco companies intended to exploit a technology opportunity, they needed to act quickly before getting caught by another wave of technology cycle.

The first challenge with a new technology to be used in a new product in the market was to get all stakeholders’ agreement on a project scope. Since there was no one who had the full understanding, and its implications yet, everybody put forward their anticipations. Different expectations and assumptions about a new immature technology with many unknowns caused delay, risking delivery date and even the whole project. Once a product idea was justified with a good business case, it needed to be focused, and delivered in a realistic short time. If a project was halted long for some reason, technology moved forward, and a complete scope revision became vital to meet the customers’ current demands.

Often, when Telco companies selected an area to beat their competitors and to open a gap between them, they offered totally new technologies. However, being the first came with a cost; not only paying a high price for such a technology, which would be cheaper in a few years and replaced with newer technologies, but also the cost of solving early adopters’ problems. Initially, they expected their customers to value the new technologies when such a product was launched, however, it often turned out to be a product with a high price tag without any customers.

Technology changes are not always bad and unwanted. They may have removed a product deficiency or technical limitation in some old products, and made them more sellable. When a new technology replaced previous products with better functionality, it let the project managers have a fresh start. In other words, new technologies became a rescue to solve outstanding product issues and problems. Due
to the nature of the industry, the products quickly become obsolete, and newer technologies with better functionality supersede old ones in a shorter time than may be needed to perfect a product.

**Business Processes:** What often appeared on face value to be routine project management activities obscured what was in reality challenging the project managers the most. The researcher specifically asked the participating project managers to compare among all difficulties they met in their NPD projects and on which they expended much effort, or he queried other participants on what they observed. The consistent answer was the integration of technologies with business processes; a new product is complete only when complementing support processes and systems are in place. Furthermore, the feedback from the project sponsors indicated that good processes and systems can often compensate for the technical limitations, increase customer satisfaction, and influence a new product’s success. The business products especially required very reliable and robust processes, since any failure in the products is directly related to the customers’ financial loss.

As more organisational groups are involved in process change, the possible interactions among them increase exponentially. Each group has its preference, and reaching an agreement among all required significant effort. In some projects, a dedicated project manager was assigned specifically to handle process aspects. Therefore, the number of stakeholders is an indication of complexity in Telco NPD projects. The fewer they are, the less the complication among the interfaces, and the easier it is to manage. At the extreme, an organisational structural change was required to support a new product. In this case, project managers had bigger challenges, and needed senior management support to implement them.

The participants who had worked in more than one industry emphasised that the business process aspects differentiate Telco from other industries, especially from information technology (IT). In an IT project, these were not a concern at all; they have well established development processes to produce a piece of system or software for given requirements. In the literature, projects are also reported that implement system and business process integration across many stakeholders with some similar characteristics. A close example is Enterprise Resource Planning (ERP) implementation (GAPPS, 2006), which may take years. However, Telco still differs from them, because ERP projects are internal to a company, take longer, and are not exposed to short term technology fluctuations.

**Competition - Time-to-Market:** The technology life cycles require Telco companies to deliver NPD projects in a short time. And, it is not the only reason why fast time-to-market is crucial. The researcher questioned the project sponsors as to what was the most important key performance indicator in NPD projects. They consistently emphasised time-to-market with an acceptable quality. This has consequently influenced the way NPD projects are managed. There is a race to be one step
ahead in the game. The NPD projects have now become more critical than before, because there is not much room to fail under strong competitive pressure.

The project sponsors attempted to match the project scope to the latest demands from the market during a project’s progress. Sometimes, where a project started and ended varied from the original plans, especially when a project’s delivery date was moved further and further for various reasons. When a NPD project is initiated, it is desirable to run it from beginning to end without any pause. In addition to the technology advances, the impacts from changing customer requirements during a project life cycle were among the challenges; the longer a project ran, the more changes occurred in the project scope.

External Parties Involvement: Whenever a new technology is involved in a project, the company has often not gained the capability to support it yet. Consequently, it required more collaboration with vendors that supply new technologies with the following challenges: First, in some cases vendors advertised as if their equipment works brilliantly without explicitly revealing any drawbacks or limitations. In such projects, the project managers thought that their companies were like a test bed for a vendor offering a new immature technology. It was seen as a cost to be first in the market with that technology. When a proper risk calculation was not made, some of these projects were terminated. Second, once vendors achieved a toe-hold in the company, they tried to create a dependency for future business opportunities by enforcing their proprietary standards, instead of open ones. Therefore, Telco companies need to be careful what they are introducing into the company, it may block future growth in a business area. Third, vendors’ experts and resources were out of reach, and the project managers had no direct influence on them. The co-operation with them was determined in contractual terms, and specific procedures needed to be followed for proper engagement. Tender contracts are important, when introducing a new technology or equipment. If a vendor does not deliver, Telco companies should then be able to change or terminate the contract with minimum loss.

Last but not least, some big projects involved more than one vendor, that is, more external stakeholders with additional interfaces, and therefore more complexity. The workload on project managers increased significantly for co-ordination and proper planning among them. A widely used approach was to assign another system integrator company. This turn-key agreement gave space to the project managers to focus on company internal changes, and they managed all other vendors through a single point of contact. However, this came with its problems: adding an intermediary distorted the message going to other vendors; losing some control, the integrator pushed their own agendas; and consequently compromises were made along the way. Senior managers preferred to use internal personnel as much as they can in key projects, because they could exercise much more control and flexibility.
External parties involvement in NPD projects was not limited only to vendors. Due to the nature of the regulated industry, Telco companies are legally forced to share their infrastructures, but they do it at a minimum level to stay competitive and keep attractive product features to themselves. This unavoidably imposed limitations on a product that crossed over a competitor’s network. Although their interfaces must satisfy minimum criteria, they need to co-operate with that Telco company to make a new product work properly.

Senior Management Involvement: Senior managers own company resources on behalf of shareholders, and it is one of their fundamental responsibilities to use them for developing new products that contribute to a Telco company’s strategic direction and growth. The stakes at that level in the organisational hierarchy are high to complete the projects in time to respond to the competitive pressures. Their interventions in NPD projects create a sense of urgency, thereby driving the project management success. This is the frequently encountered explanation in the literature why senior management involvement is important in NPD (Hunt and Kosaroglu 2006). In addition to the examples validating this, several others were also cited where senior managers’ engagement had wrecked the NPD projects. In some large and complex projects, there were many stakeholders, and each of their senior managers pushed for their own benefits. As identified in the well known agency theory (Eisenhardt 1989), their own agenda and political concerns behind the scenes and biased decisions that did not align with the project goals, caused the project managers and team members to suffer. If they aligned with NPD project goals, their impact was positive; but if not, they were destructive. In some NPD projects, senior managers overruled project managers’ recommendations, since they considered other criteria that were not relevant to a NPD project. They selected vendors who provided better financial deals, or with whom the company had reciprocal business relations, rather than because of their technical capability. These projects were often delayed, a major revision in the project scope was needed, or the vendor was later replaced with a technically expert one. It required tremendous effort and a long time for project managers to bring such projects to a successful end.

Senior managers did not always view NPD projects the same as the project sponsors, who aim to differentiate a new product from competitors by offering value adding features. When evaluating the projects, senior managers tended to lower these features’ priority, as long as the basic functionality was delivered, and to lose the focus on those differentiating features. Furthermore, they allocated resources to other projects waiting in the queue that could create more revenue, leaving a half delivered project from the sponsor’s point of view. This again shows that senior managers’ focus is often short term, and predominantly financial only.
**Project Financial Processes:** Large and complex NPD projects contain many unknowns, and uncertainties. Although in the initial stages of a project NPD process it is assumed there would be cost and duration variations, the annual budgeting processes, which Telco companies generally operate with, did not reflect these impacts properly. This mismatch forced project managers to commit to a delivery date early in a project. In anticipation of this, project managers added buffers in their estimates. After a detailed technical analysis or during development, even those extras put in place did not always suffice. With large variations, project managers faced the difficulty of obtaining additional funding and resources. They needed to justify the increase to senior management who have the power to shift the resources across projects. Increasing a project’s budget in the middle of a financial year was very challenging. Their project managers had to go through several bureaucratic procedures, and produce reports as to why the variance occurred, and how to address the deviations from the original plans. Their attention shifted away from project execution, and eventually their projects halted. As there were other projects competing for the same resources, the functional managers allocated them to those having funds. Even if project managers succeeded in getting the additional support, they had a second challenge to get resources back into their projects, which was much harder than getting them first time. Depending on the budget change, the bureaucratic approval procedure for the amendments sometimes took many months; the longer the break, the more difficult to bring a project back on track.

A financial discipline was observed in the majority of the cases. Their processes do not allow the purchase of any equipment, before a project reached a certain stage, where the solution has been reviewed and understood to satisfy the requirements. However, this was inconsistent in product development groups in the old state owned Telco company. In some projects, they bought their equipment, without even waiting for an approval or finalisation of the project requirements; in some others, they were strict to obtain every signature. This is related to how those groups follow formal project management processes; the first group had a tendency to bypass the NPD processes, and usually ran their NPD projects ad hoc. This is a mixed picture, as the company is passing through a big transformation to leave old habits, and to adapt to the changing industry conditions.

**Practices for fast time-to-market NPD**

Telco companies already have, or they are planning to employ some practices to shorten the NPD project cycle. They are not only specific to Telco, but its conditions have some implications that need project managers’ attention. The practices found during this research are shortly presented below.

*Phased Product Delivery:* Even though the scope may not be very clear from the start, time is too valuable to stop everything until all details are defined. The most common approach to use time effectively was to deliver project outcomes in multiple releases, usually called phased delivery. The
basic functionality requirements were determined first, and the development work was started. During the project’s progress, the rest of the requirements were agreed, and the project plan was extended to accommodate them. Closely related works were grouped together to form a product release. This created room for both meeting marketing demands, and ultimately delivering a complete product at the end. However, project managers need to be careful, as the following issues were observed in some of the projects that had phased delivery: First, the development work ended up having incompatible patches, and each phase deployment required a complete review of the product. Second, once the base product was launched, senior management wanted to allocate resources to other projects in the pipeline, thus terminating a NPD project without completing its scope. Third, if the delivery phases were far apart, the technology advanced, and it required a review of the original requirements. Consequently, a release should be defined with clear boundaries in a whole product delivery road map, and project managers should consider where a new product may conclude.

**Modular Product Development:** There are different standards and systems that Telco companies use in their networks. Depending on its impact a NPD needs to cover many of them. A modular approach that defines a product as consisting of modules (i.e. what they do, and the interfaces to its neighboring modules) confines the development work into pieces with well defined boundaries. Therefore, any new product or incremental product change can be scoped in each module, and their developments can be performed in parallel. Smaller chunks of changes are simpler, and faster to implement. It also makes a NPD project’s artifacts usable in other projects. Theoretically, this sounds logical, however, the disadvantages were: defining modules was not easy, because different products required different interfaces; it limited customisation especially for business products; and a new product inherited all the technical and operational limitations of the modules that it relies on. Considerable effort that extends beyond the original project scope may be needed to make a new product work in modules.

**Process Automation:** One of biggest challenges in Telco is the complicated business processes that are tailored for each product. As the number of products consist of fewer and standard components, the process automation is more cost effective and efficient, providing reliable and faster customer service. There is currently a strong demand in Telco for such applications called Operations Support Systems (OSS) (Andreau, Benni, Pietraszek & Sarrazin 2004). The consumer products have reached a high level of standardisation, and the volume necessary for process automation to be of benefit. However, it was not quite as easy for business products, where customisation is the norm. Although a degree of automation can be achieved, it seems to take longer.

**Flexible Project Management Processes:** NPD project management processes were observed not to be followed strictly in any of the cases. Time-to-market was the main reason for having this flexibility; time is too valuable to satisfy every process requirement. Although on paper, all companies have well
defined processes, when it comes to practice every project had variations. Blindly following the processes has not guaranteed project management consistently; they either missed delivery dates, or resulted in a new product with many missing valuable features. To cope in such a dynamic business environment, the processes were taken as guidelines, not mandatory. Project managers were all aware that going faster increases the risk of making mistakes, and they made a compromise between satisfying key processes and time-to-market. The freedom to apply project management processes requires skillful and strong project managers to decide what and what not to do, to attain quality new products in challenging time-to-market goals. Consequently, Telco NPD project managers skills attract attention, and need investigation. Analysing the project challenges, reported in this paper, is an important step in this investigation.

CONCLUSIONS

This paper has presented empirical findings of a research study that investigates Telco NPD projects’ contemporary management challenges. Our analysis has resulted in a simpler classification of Telco NPD projects into just two categories: small, and large and complex. Since small projects do not present many challenges, the study has thus focused on large and complex projects. Time-to-market needs to be short to meet the quickly changing market demands, and to maximise the benefits from a new technology. The speed of project execution does not allow much time for managing changes due to new business processes. This aspect, therefore, was clearly the biggest challenge that the project managers face. Exercising direct control over resources of external vendors that supply new technologies and equipment is not possible. Consequently, project managers need to be more risk aware, when working with them. Another challenge is securing senior managers alignment with a NPD project goals. Lack of this alignment impacts the project negatively. When a project needs additional resources and funds, then it is another challenge to obtain them, once the organisation-wide budgets and plans are fixed. Finally, we looked at what Telco companies do to shorten the NPD project life cycle. Phased product delivery, modular product development, process automation and flexible project management processes were encountered during the interviews. Other competitive industries having such technology dependencies, may have similar project management implications.

As mentioned in the introduction, this paper presents a part of an ongoing bigger research. This study concludes Telco NPD projects require skillful project managers to cope with the challenges presented here. So, what we use from this study is for investigating which skill sets project managers need, or do not need, to be successful, and in which phases of the projects they are needed. Our research continues for the next step: connecting the findings above to the project manager skill sets, that were initially developed theoretically and then tested in a limited pilot study, over multiple cases and more participants from different stakeholder groups.
REFERENCES


