Strategic Resource Planning at Ericsson Research Canada

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Introduction

The illustration on the front page exemplifies how overloading a system, whether a truck, a computer or a development organization does not result in a more efficient use of their resources but rather on its collapse under a weight they were not designed to carry.

As organizations turn to the *project form* as their preferred way to organize their development work, the need to coordinate the use of scarce resources and align initiatives becomes evident.

In addition to the problems that arise in a single project, the multi-project environment introduces challenges of their own: implicit dependencies created by shared resources, loss of productivity due to resource multi-tasking and subtle reinforcing loops that propagate delays from one project to another.

This paper explains the strategic resource planning process put in place at Ericsson Research Canada to address these challenges.

The problem of resource over-commitment

Prior to the introduction of the strategic resource planning process, some of the product development centers hosted at the Montreal Design Center, were suffering "paralysis by over-commitment". The problem of over-committing resources, see Figure 1, is such that once the process gets started, it keeps feeding itself. An informal study, conducted by searching the Ericsson intranet, showed that 58% of the problems reported on the projects' progress reports referred to coordination and resource availability and not to technical problems.

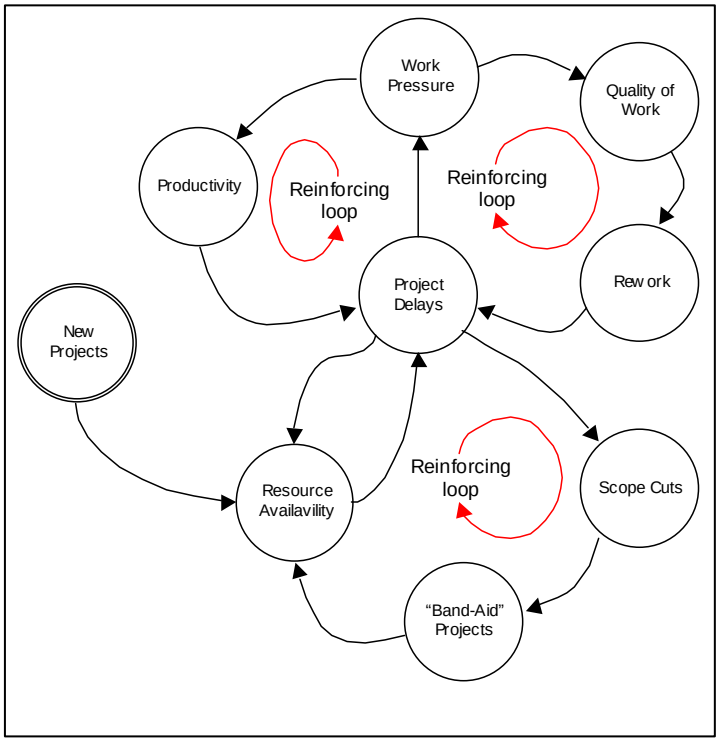

Figure 1- The vicious cycle triggered by the over-commitment of resources

The vicious cycle illustrated in Figure 1 works like this. As the projects deadlines start to fall behind, three things happen: First the work pressure increases, this which might initially produce some results, soon leads through a loss of productivity, to further delays. Second the quality of work is compromised; this eventually leads to an increase in the workload due to rework, which fuels additional delays. Third, cuts in the scope of the projects, originated in attempts to keep the promised deadlines, foster a myriad of "Band-Aid" projects that negatively affect the availability of resources further aggravating the delays.

The new product development process, usually depicted as a funnel through which the projects with the highest pay-off flow orderly, under the circumstances described above

becomes the pressure cooker illustrated by Figure 2. Projects started in these conditions are doom to fail.

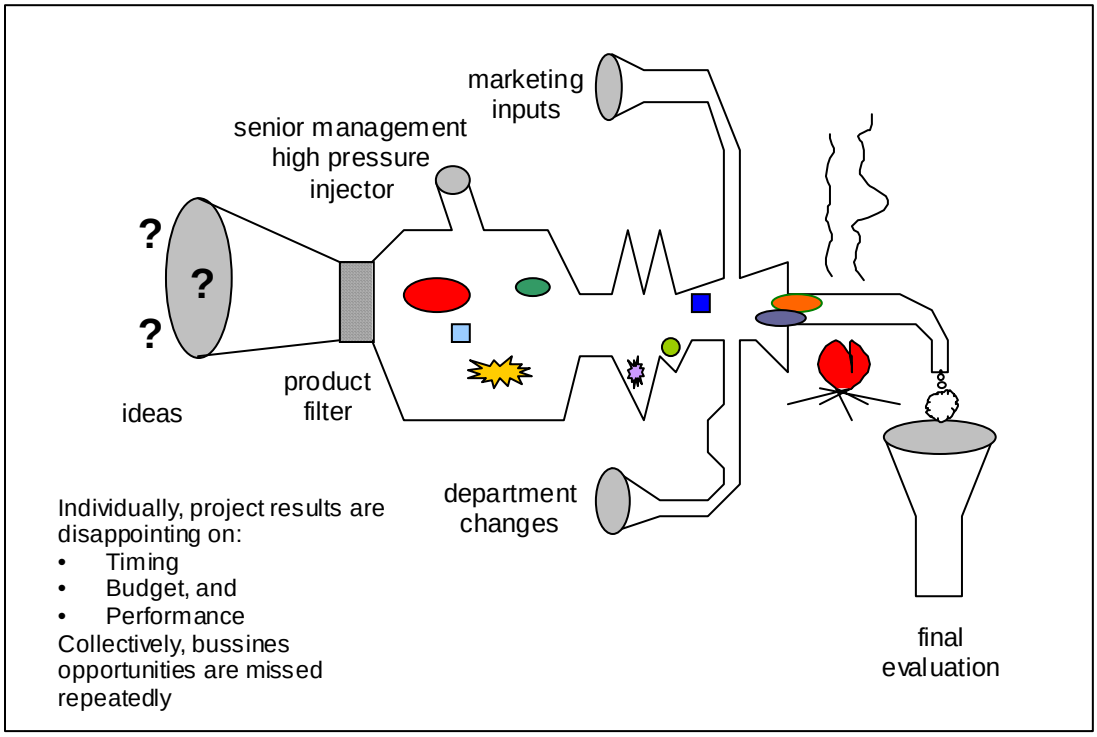

Figure 2 – The product development process (Adapted from Managing new product and process development, K. Clark and S. Wheelwright, Free Press, 1997)

The production of sound strategic plans requires that the organization considers resource allocation conflicts, technical dependencies, financial constraints, revenue projections and its long-term growth strategy; it also requires that the people doing the planning take into consideration the uncertainty present in all estimates. Acting as if we had 100% planning accuracy, is a recipe for failure.

The Strategic Resource Plan

The Strategic Resource Plan comprises three data structures: the Master Plan, the Resource Plan and the Financial Forecast. The Master Plan is a time-scaled view of all the projects included in the project portfolio covering a planning horizon of two to three years. The projects in the plan are portrayed as single tasks characterized by their tentative start date, their duration, the effort required, their funding needs and their effort spending profiles. Additional information about the projects could include the degree of commitment to the project, i.e. whether the project is in execution, planned or envisioned, the status, i.e. whether the project is on-time, or delayed, for those under execution and the technologies or products they support. The Master Plan might also include relationships between projects and links to technology and product road maps.

The Resource Plan is a forecast of the resources necessary to execute the projects included in the Master Plan. The Resource Plan covers the current availability of resources (headcount), their competencies, a recruiting plan and periods where excess capacity might exist. The resource plan shows whether the resource utilization is based

on current, planned or envisioned work. The resource plan is prepared based on the competence of the resources and not by assigning specific individuals to the projects.

The financial forecast depicts the cash flows, expenses and revenues, arising from the execution of the projects in the Master Plan with the purpose of helping senior management and project sponsors to choose the portfolio configuration that best meets the objectives and capabilities of the organization. The financial information contained in the forecast includes: labor costs, non-labor costs, management reserves, volume allowances and funding sources.

The Process at Ericsson Research Canada

Figure 3 depicts the strategic resource planning process followed at Ericsson Research Canada. Inputs to the process are described in Table 1 and Figures 4 to 6 illustrate typical outputs.

The forecasts are made by first breaking down the total number of hours specified for a project in hours per competence type, i.e. project management, system engineering, software development, system integration, network support, etc. and second by spreading the number of hours allocated to each competence over time according to a set of user defined load curves. The breakdown by competence together with the set of curves used for spreading the hours is called a project profile.

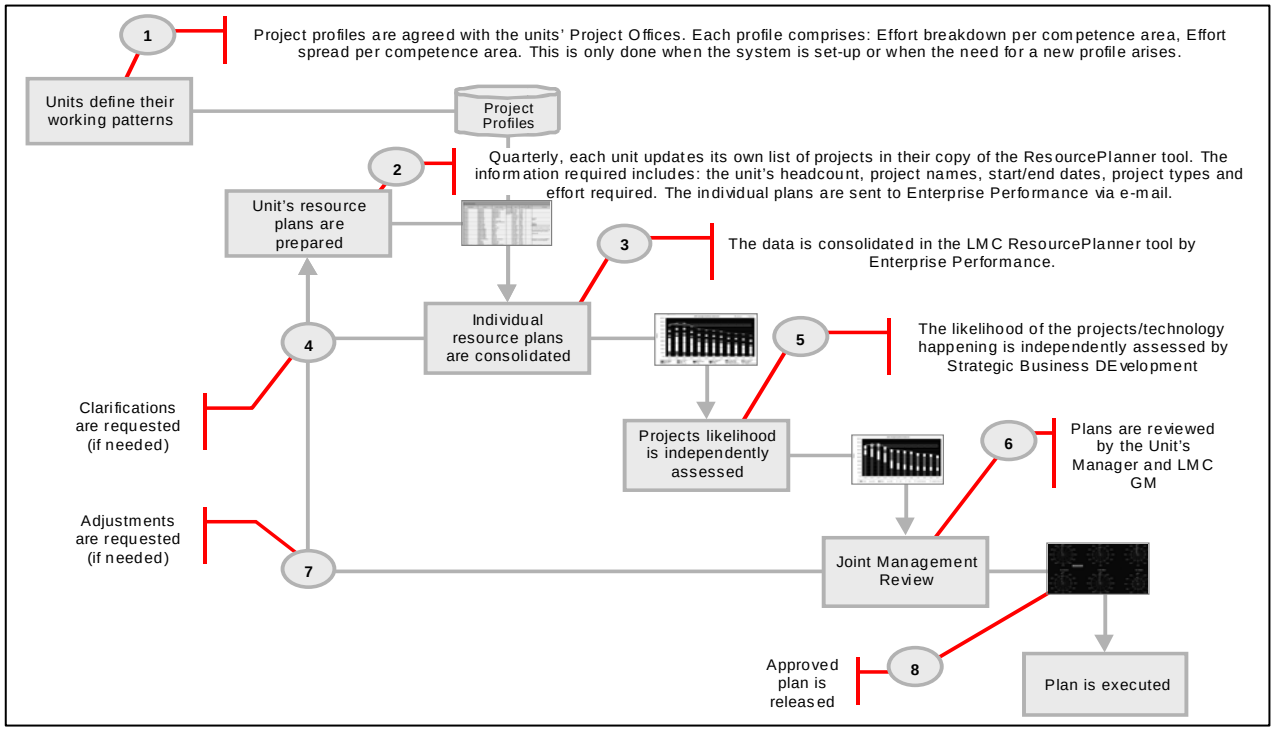

Figure 3 – The strategic resource planning process at Ericsson Research Canada

Group	Field	Description
N/A	Department	Department or unit Name
	Product	Product name to which the project or activity applies
	Project/Activity	Name of the project or activity. Must be unique.
	Technology	This information is required by the Strategic Business Development (SBD) Group to monitor the transfer of resources from 2G to 3G and from "TDMA/CDMA" to "WCDMA". The criteria to be used is as follows: • Criteria 1 • Criteria 2 • Criteria 3
	Status	Select one of the following: Executing; Committed; Planned; Envisioned. Use the following criteria for selecting the appropriate value: • Execution, for on-going work • Commited, there is a signed work assignment • Planned, the work is part of the defined evolution of a product line or there are on-going conversations with potential sponsors which makes the chances of this project happening are better than 50/50. • Envisionned, this includes new mandates the unit is trying to obtain, new products or new applications of existing ones that the unit forsees but that have not been included in the sponsor product portfolio yet. Or any other work for which a chances over 50% cannot be demonstrated.
	Likelihood	The project likelihood reflects an independent and subjective assessment of the probability of the project actually happen in light of economic and technology changes.
	User Defined	Up to each unit.
	Description	Two or three keywords describing what the project is about.
	Development Profile	Choose the applicable type of project or competence.
Project Start	Earliest	The following choices are allowed: Most Likely; Earliest-Latest; Earliest-Most Likely-Latest. If the project is already started, specify the actual start date.
	Most Likely	
	Latest	
Duration	Shortest	The following choices are allowed: Most Likely; Shortest-Longest; Shortest-Most Likely-Longest. If the project is already concluded, delete it from the list.
	Most Likely	
	Longest	
Effort	Minimum	The following choices are allowed: Most Likely; Minimum-Maximum; Minimum-Most Likely-Maximum.
	Most Likely	
	Maximum	
Non-Labour Costs	Minimum	The following choices are allowed: Most Likely; Minimum-Maximum; Minimum-Most Likely-Maximum. If you don't want to specify cost, type "0" in the Most Likely field.
	Most Likely	
	Maximum	
General Availability Date	Earliest	The following choices are allowed: Most Likely; Earliest-Latest; Earliest-Most Likely-Latest. If the project is already started, specify the actual start date.
	Most Likely	
	Latest	
N/A	Same as	Is used to link to projects together.

Group	Field	Description
	Lag	Is used in conjunction with the “Same as” to specify a relative displacement of the start of a project or activity.
Life Span	Shortest	Specifies the expected lifetime of the product/deliverable in the market. The following choices are allowed: Most Likely; Shortest-Longest; Shortest-Most Likely-Longest. If the project is already concluded, delete it from the list. If you don’t want to specify life span, type “0” in the Most Likely field.
	Most Likely	
	Longest	
N/A	Support Profile	If there are support activities attributed to this project, specify the profile that characterizes them.
Post Sales Support	Minimum	The following choices are allowed: Most Likely; Minimum-Maximum; Minimum-Most Likely-Maximum. If you don’t want to specify cost, type “0” in the Most Likely field.
	Most Likely	
	Maximum	

Uncertainty in the plans is captured by requiring three values (best, most likely and worst case) for parameters such as project effort and project duration and running a Montecarlo Simulation which involves correlations between projects to calculate the probability distribution of the resulting forecasts.

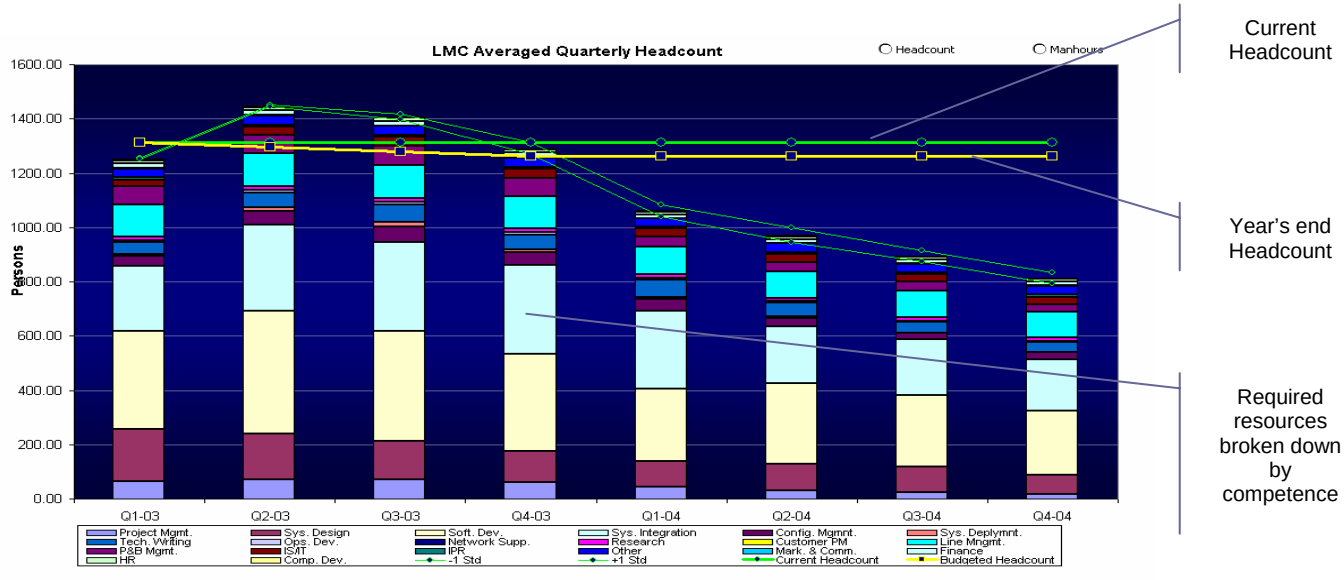

Figure 4 Headcount broken down by competence area

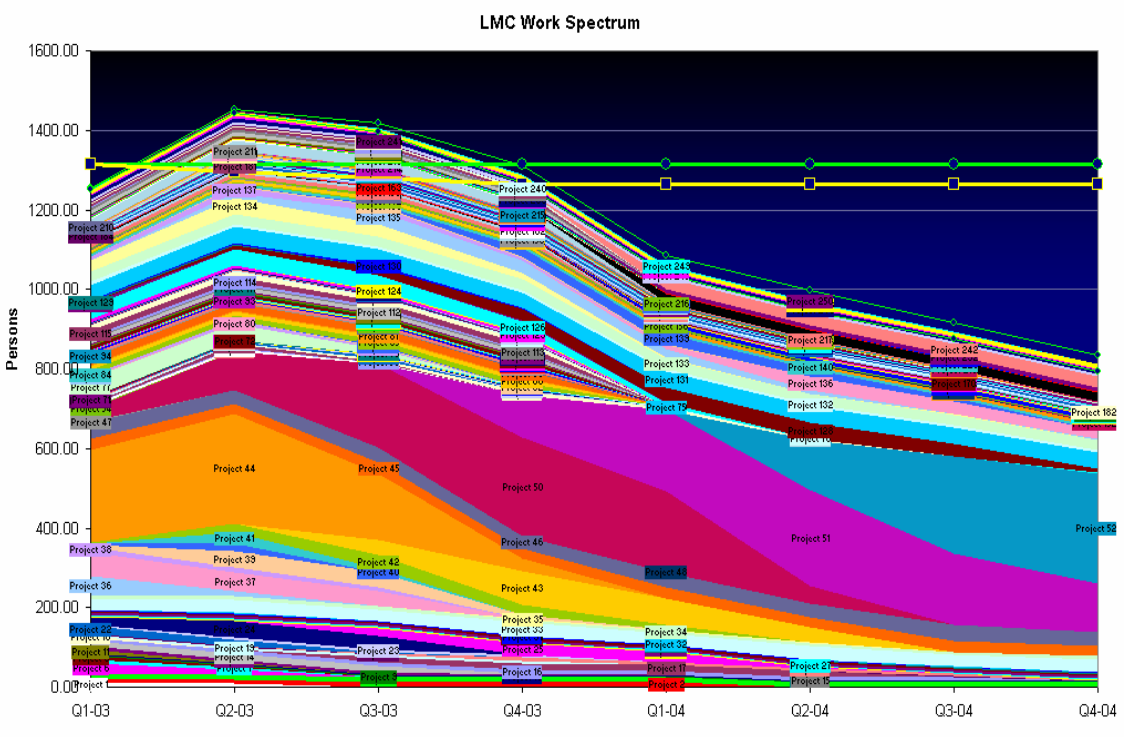

Figure 5 Work spectrum. The chart shows the distribution of effort over time required by each project in the portfolio

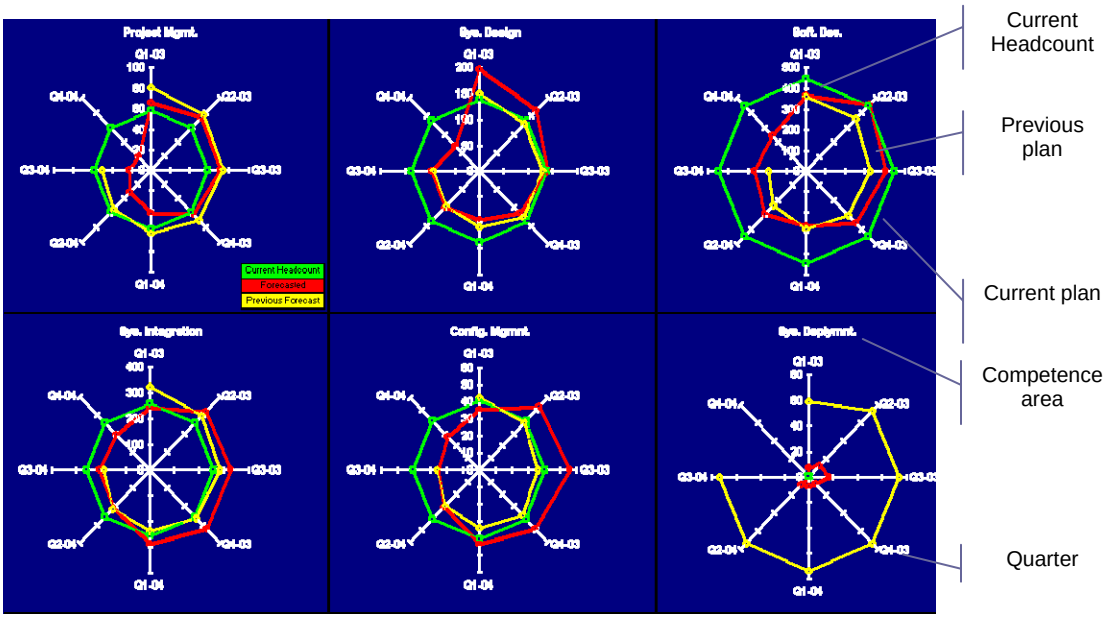

Figure 6 Capacity vs Demand charts showing the forecasted workload against the current headcount for each competence category

Executing the plan

The execution of the plan consists in balancing the resources with the workload within the constraints imposed by the business strategy. The balancing process employs five instruments:

- Frame Agreements

- Transfers
- Competence development
- Downsizing
- Recruiting

Frame agreements are temporary loans of resources used to bridge surpluses and shortfalls. Transfers imply moving resources from one unit to another in situations where a business or product is reaching the end of its lifecycle and another is starting. Competence development is an instrument used to respond to the continuous evolution of technologies. When balancing could not be achieved through these three instruments, and only as a last resort management resorts to lay-offs or recruiting.

Key Success Factors

The success of the strategic planning process implemented at Ericsson Research Canada can be explained in terms of three features:

- Providing management with information they can act upon
- Low maintenance
- Data ownership

The strategic resource planning process provides management with the information they need. The process is designed to answer the following questions:

- Do we have enough people to meet our current demand?
- Do we know what are we going to be doing next year?
- Do we have a balanced workload?
- Where is people need next? When?
- Where are people available? When?
- What competencies are required next? When?
- What can we move to make room for an urgent request?

Management emphasis is put in understanding how shortfalls and surpluses are being addressed and not in drawing nice looking charts that match the availability of resources.

Low maintenance, other of the key factors contributing to the process success, is based in the fact that the process requires readily available data:

- Project name
- Start date
- Duration
- Effort required
- Market availability date
- Product life span
- Post sale support

The lead-time between the time the process get started until it is published takes less than two weeks, including the management review. Processes requiring detailed planning and resource allocations usually fail because of the high-cost and the lateness associated with gathering the required data.

The third success factor is that the forecasts are based on planning constants (profiles) provided by each unit. This prevents units from challenging the planning results on the basis of a process mismatches or the uniqueness, real or perceived, of their own work. Independent review of the data submitted keeps the units honest, preventing padding of estimates and the reporting of unlikely work.

Summary

The Strategic Resource Planning process introduced in 2001 and institutionalized in 2002 has helped Ericsson Research Canada navigate through the tumultuous climate resulting from the contraction of the telecommunications industry. It has done this by:

- Creating an aggregated view of the capacity and needs of the organization
- Strengthening the ability across the company to plan for resource buildup, reduction or transfers; and
- Providing a factual base for negotiations of new or changed mandates

References

- Running the Successful Hi-tech Project Office, E. Miranda, Artech House, March 2003
- Strategic Resource Planning Process, Ericsson Internal, January 2001
- Managing New Product And Process Development, S. Wheelwright and K. Clark, The Free Press, 1997

Author Biography & Contact Information

Mr. Miranda is a Program Director at Ericsson Research Canada. His work spans the development and maintenance of real-time and information management systems. Currently Mr. Miranda is working in the development of new estimation and planning approaches for R&D projects. Mr. Miranda is also affiliated with the Université du Québec à Montréal as an Industrial Researcher.

Mr. Miranda holds a Master of Engineering degree from the University of Ottawa and a Master degree in Project Management from the University of Linkoping. Mr. Miranda has published over ten papers in software development methodologies, estimation and project management and is the author of the book “Running the Successful Hi-Tech Project Office” published by Artech House in March 2003.

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