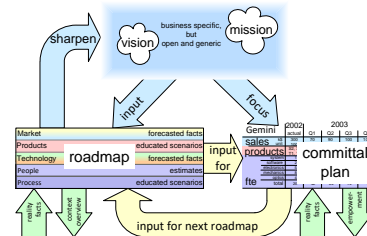# The role of roadmapping in the strategy process

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Abstract

The strategy process is positioned in a simplified decomposition of the business in processes. The "CAFCR" model is introduced as a means to structure a roadmap (CAFCR is also used as a means to structure architecture descriptions and methods).

The steps to come to an integral roadmap are explained. The goal of the roadmap is discussed, in relation with mission and vision and in relation with a committal plan.

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1 Process decomposition of a business

The business process for an organization which creates and builds systems consisting of hardware and software is decomposed in 4 main processes as shown in figure 1.
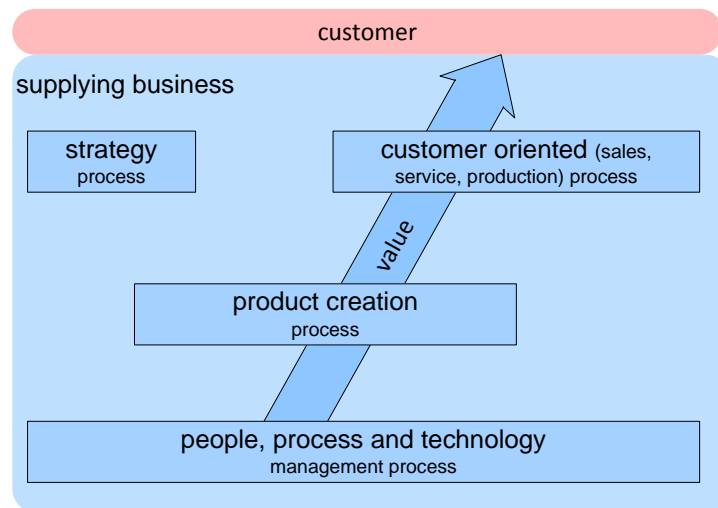

Figure 1: Simplified decomposition of the business in 4 main processes

The decomposition in 4 main processes leaves out all connecting supporting and other processes. The function of the 4 main processes is:

Customer Oriented Process This process performs in repetitive mode all direct interaction with the customer. This primary process is the cashflow generating part of the enterprise. All other processes only spend money.

Product Creation Process This Process feeds the Customer Oriented Process with new products. This process ensures the continuity of the enterprise by creating products which enables the primary process to generate cashflow tomorrow as well.

People and Technology Management Process Here the main assets of the company are managed: the know how and skills residing in people.

Policy and Planning Process This process is future oriented, not constrained by short term goals, it is defining the future direction of the company by means of roadmaps. These roadmaps give direction to the Product Creation Process and the People and Technology Management Process. For the medium term these roadmaps are transformed in budgets and plans, which are committal for all stakeholders.
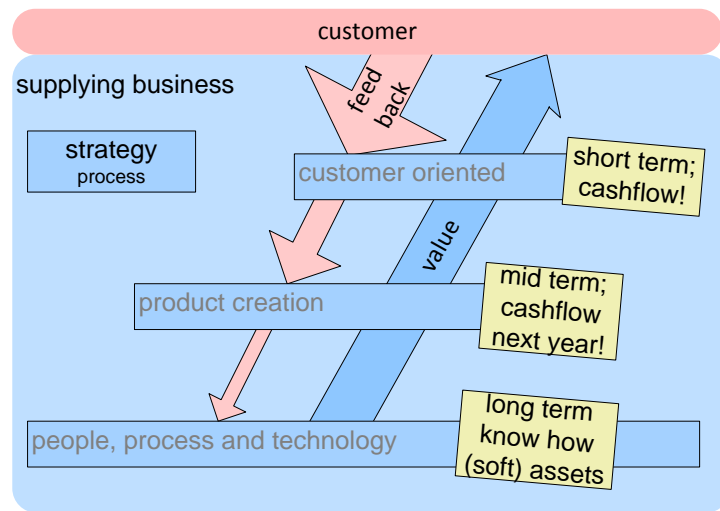
Figure 2: Tension between processes

Figure 2 characterizes the processes from the financial point of view. From bottom to top soft or latent value (the assets) are transformed in harder value, to become true money when the customers are paying for the products and services (the cashflow).

At the same time figure 2 shows that the feedback flow from the customer into the organization moves in the opposite direction. A nasty phenomenon is the deformation and loss of feedback information while it flows through these processes. The further away from the customer, the less sense of urgency and the less know how of the customer needs. In many organizations this is a significant problem: competence organizations which have lost the sight of the customer and become introvert.

In many companies the value chain is optimized further, by using the synergy between products and product families. Figure 3 shows that the simplified process decomposition model can be extended by one process *component or platform creation* to visualize this strategy. This optimization is far from trivial. At the one hand synergy must be used, most companies cannot afford to create everything from scratch all the time. At the other hand is the consequence of the set up shown here that the value chain becomes longer (and takes somewhat longer), while the feedback deformation and loss increases even further! A more elaborated discussion on these aspects can be found in [1].
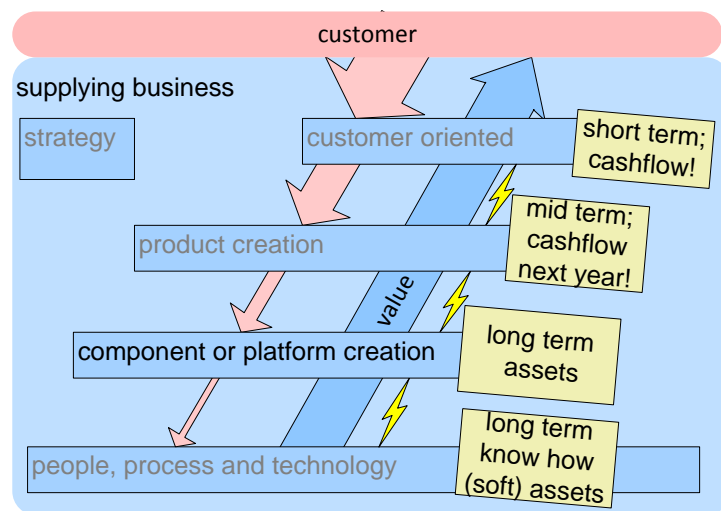
Figure 3: Platform strategy adds one layer

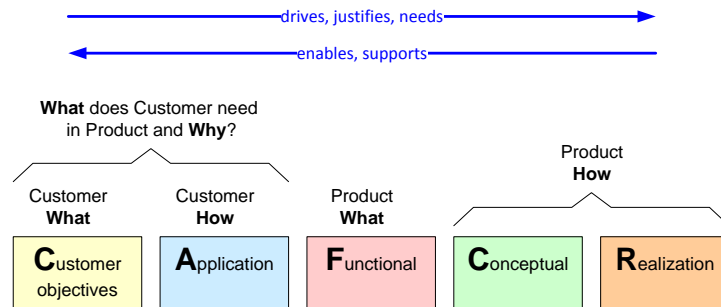# 2 Framework for architecting and roadmapping

Figure 4: CAFCR framework for architecting

Figure 4 shows the "CAFCR" framework for system architecting, see [4]. The *customer objectives* view and the *application* view provide the **why** from the customer. The *functional* view describes the **what** of the product, which includes (despite the name) also the *non functional* requirements. The **how** of the product is described in the *conceptual* and *realization* view, where the conceptual view is changing less in time than the fast changing realization (Moore's law!).

The job of the architect is to integrate these views in a consistent and balanced way. Architects do this job by *frequent viewpoint hopping*, looking at the problem from many different viewpoints, sampling the problem and solution space in order to build up an understanding of the business. Top down (objective driven, based on intention and context understanding) in combination with bottom up (constraint aware, identifying opportunities, know how based), see figure 5.

In other words the views must be used concurrently, not top down like the waterfall model. However at the end a consistent story must be available, where the justification and the needs are expressed in the customer side, while the technical solution side enables and support the customer side.

The term *customer* is easily used, but it is far from trivial to determine the customer. The position in the value chain shows that multiple customers are involved. In figure 6 the multiple customers are addressed by applying the CAFCR model recursively.

The customer is a gross generalization. Marketing managers make a classification of customers by means of a market segmentation. Nevertheless stay aware of the level of abstraction used when discussing **the** customer/market/market segment.

The viewpoints of the "CAFCR" framework are useful for setting up a roadmap as well. However on top of these views also *business*, *people* and *process* views are needed in a roadmap, see figure 7 and [2].
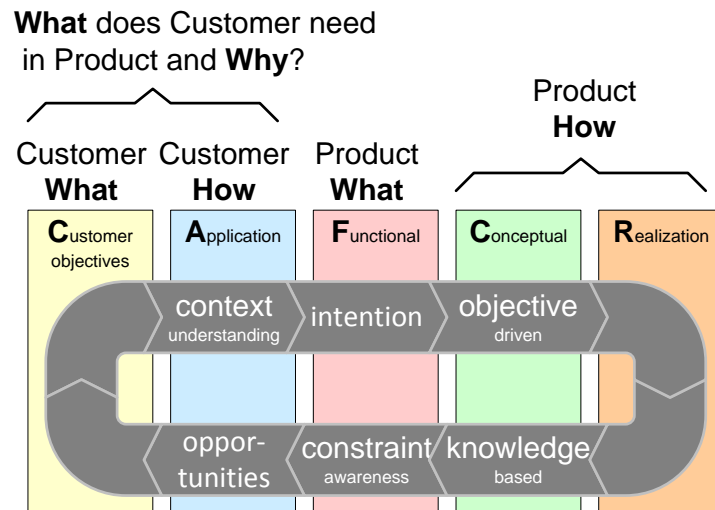
Figure 5: Five viewpoints for an architecture. The task of the architect is to integrate all these viewpoints, in order to get a *valuable*, *usable* and *feasible* product.
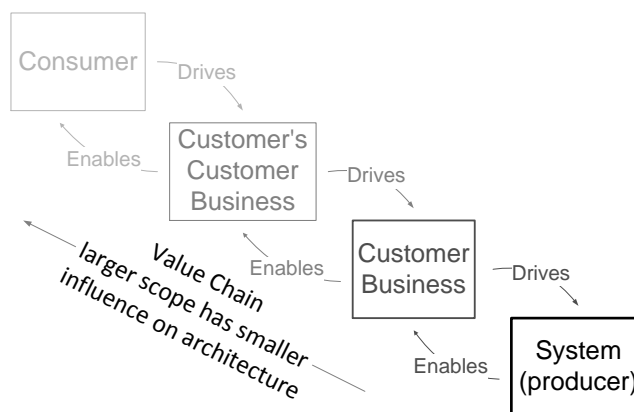

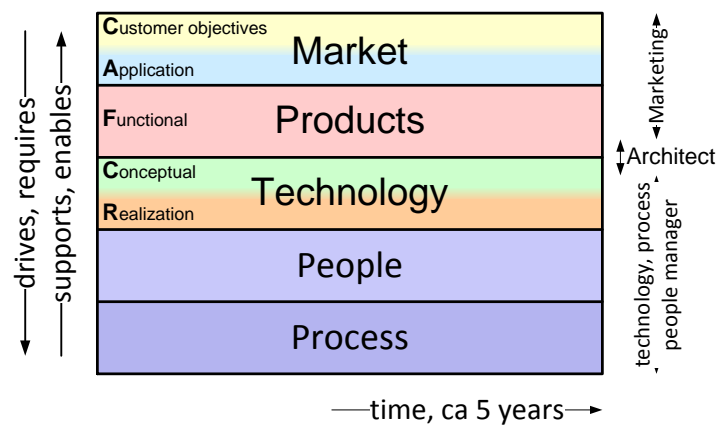Figure 6: CAFCR can be applied recursively

Figure 7: Structure of a roadmap

3 From vision to roadmap to plan and further

The identity or the main focus of a company is often expressed in a mission statement, supported by a vision on the market, the domain and its own position in market and domain. The nature of both mission and vision is highly generic, although business specific. Mission and vision is a compact articulation of the company and its strategy.
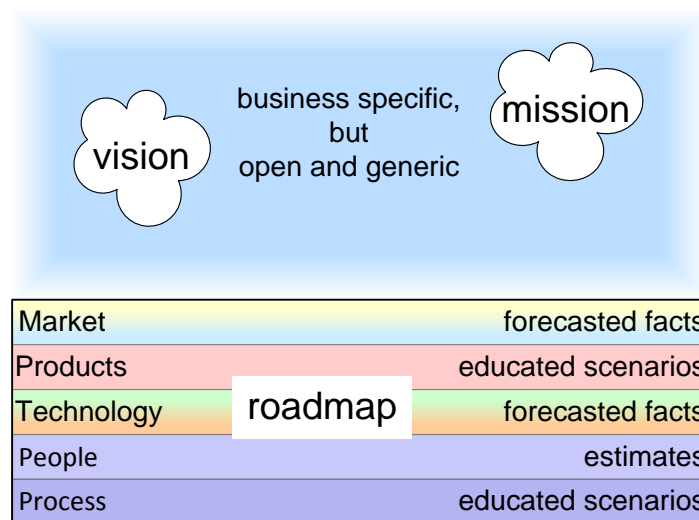

Figure 8: From generic mission to factual roadmap

The roadmap builds on vision and mission and makes the strategy much more specific in time as well as in contents. Figure 8 shows the generic mission and vision statement as overarching entities for the roadmap. As indicated within the roadmap segments its content is much more specific, containing (forecasted) facts, (educated) scenarios and estimates.

An integrated roadmap is made in steps:

1. Explore *market*, *product* and *technology* segments; what is happening in the outside world, what is needed, where are opportunities in market and/or technology.

2. Estimate *people* and *process* needs for the identified *product* and *technology* needs. These estimates should be made without constraints. The question is what is **needed**, rather than what is **possible**.

3. Determine a balanced, economic attractive and skills wise feasible content for *product*, *technology*, *people* and *process*. Here trade-offs have to be made

and creative marketing as well as technological skills are required to define an effective product roadmap, which is at the same time realistic with respect to the people and processes.
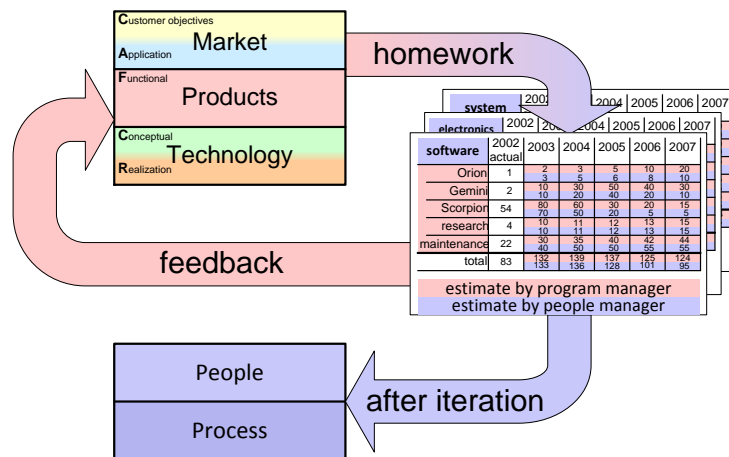

Figure 9: From Market, Product, Technology to People, Process

Figure 9 shows how to make the last few steps. The estimations for the amount of people are made from 2 viewpoints: the people and technology manager (the supplier of resources) and the operational manager (responsible for the timely and reliable result of the product creation process and hence the "consumer" of these resources).

The people and technology manager will make estimates which are discipline specific, decomposed towards the programs, see figure 10

The operational manager (or program manager) will make an estimate which is program specific. A program is a cohesive set of products, where the program manager is responsible for the timely development and quality of all products within the program. This estimate will be decomposed into disciplines, see figure 11.

Every activity is estimated twice via this approach. In both figure 10 and figure 11 the corresponding second estimate is shown as well, in other words the results are merged. This merge immediately shows differences in interpretation of the input or differences in opinion. These differences should be discussed, so either the inputs are reiterated, resulting in a shared estimate, or the difference in opinion is analyzed and a shared estimate must be the result (although the compromise may be marked as highly uncertain)

After this "harmonization" of the estimates the real difficult work starts, of tweaking the product program, the required features and being more creative in the solutions in order to come to a feasible roadmap. This step will change the *product* and *technology* segments, with corresponding changes in *people* and *process*.

software	2002 actual	2003	2004	2005	2006	2007
Orion	1	2 / 3	3 / 5	5 / 6	10 / 8	20 / 10
Gemini	2	10 / 10	30 / 20	50 / 40	40 / 20	30 / 10
Scorpion	54	80 / 70	60 / 50	30 / 20	20 / 5	15 / 5
research	4	10 / 10	11 / 11	12 / 12	13 / 13	15 / 15
maintenance	22	30 / 40	35 / 50	40 / 50	42 / 55	44 / 55
total	83	132 / 133	139 / 136	137 / 128	125 / 101	124 / 95

estimate by program manager
estimate by people manager

Figure 10: People estimate, discipline view

Figure 12 shows the people roadmap from another domain in a more visual format. In this example a clear growth of the staffing is visible, where for instance system and software are growing much faster than electronics. Besides these typical product creation disciplines also the *customer oriented* people and skills are shown. The decomposition choosen here is to the needed or expected education level (high, medium and low). The clear trend here is a significant growth of customer support people, while at the same time it is expected that the education level will decrease significantly[1].

If we decompose the people estimates from figure 12 in the operational direction then a much more dynamic picture emerges. Operational activities have a faster rhythm than disciplines. Understanding of this dynamics helps in the total balancing act required from the strategy process. Special attention should be given to the often implicit programs, such as:

- installed base management

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[1]This is a quite normal trend. Young products are supported by highly skilled people, which is possible because the installed base is still small. When the installed base is growing it is difficult to find sufficient well trained people, who are motivated to work as support personnel. At the same time the cost pressure increases, which makes it economically unattractive to hire expensive support people. All together the consequence is that investments in the product and the processes are required to operate in the more mature phase with less educated customer support people.

Gemini	2002 actual	2003	2004	2005	2006	2007
system	1	2 / 3	4 / 5	5 / 6	4 / 5	3 / 4
software	2	10 / 10	30 / 20	50 / 40	40 / 20	30 / 10
electronics	5	16 / 12	20 / 18	12 / 16	4 / 12	2 / 6
mechanics	8	8 / 12	5 / 14	2 / 8	1 / 6	1 / 3
optics	4	6 / 6	6 / 6	5 / 5	4 / 4	3 / 3
total	20	42 / 43	64 / 63	74 / 75	52 / 47	39 / 26

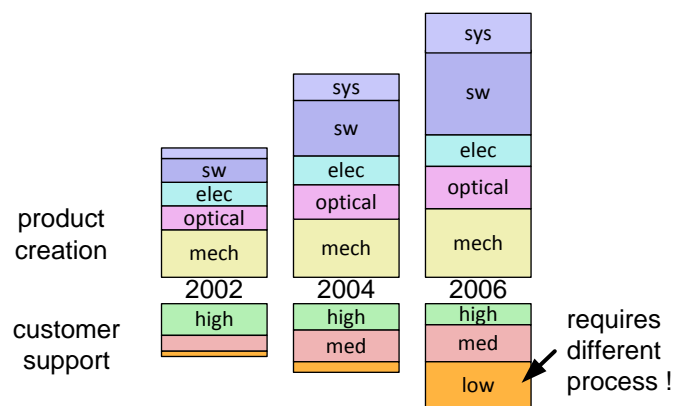| estimates by program manager |
|---|
| estimates by discipline manager |

Figure 11: People estimate, program view

Figure 12: Roadmap of people skills

- component and platform creation

- research

- development infrastructure

At the end a sanity check should be made of the balance between the explicit programs and the less explicit programs mentioned here. The explicit, product oriented programs in general should use a significant amount of the total man count, otherwise it is a symptom of an introvert organization (focus on **how** do we do it, instead of **what** is needed).

The roadmap created as described above is a means to share insight in the market and the future and to provide overview and focus to the entire organization,
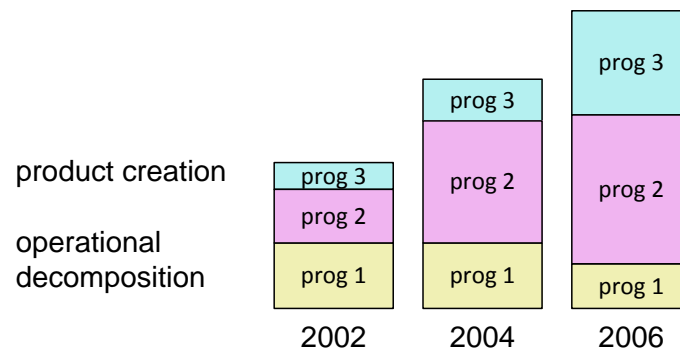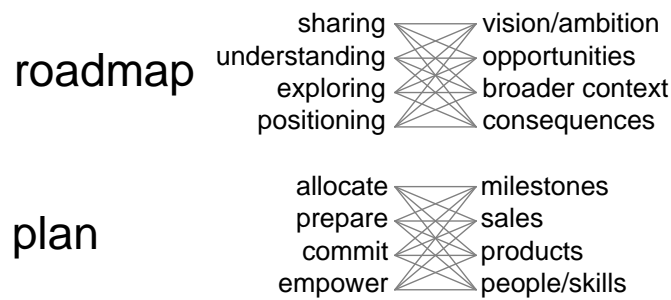
Figure 13: Operational axis is more dynamic

Figure 14: From roadmap to planning

in a broad time perspective. This process should take place in an open, explorative atmosphere. This can be achieved by keeping the roadmap as a shared snapshot of the future and not make it a committal plan. In other words nobody gains any right because of the roadmap. The roadmap does not contain hard decisions, it contains shared understanding and expectations.

The roadmap is used as input to create a committal plan, with a shorter time horizon. It does not make any sense to make long term commitments, the future is way too uncertain for hard decisions. The committal plan will typically have a scope of 1 year. Within this year a consistent set of decisions are needed, ranging from sales and turnover commitments to product creation commitments (main product characteristics and timing) to technology, people and process commitments. This commitment serves also as a means to delegate and empower, which also requires allocation of resources. Figure 14 shows the essentials of the roadmap and the committal plan.

Figure 15 shows an example of a committal plan, containing the business

Gemini		2002 actual	2003			
			Q1	Q2	Q3	Q4
sales	k$	300	70	90	100	105
	unit	100	20	25	25+3	22+7
products		S2, S3 T1, T4	S4		V6	S6
fte	system	1	2	3	3	4
	software	2	10	18	24	28
	electronics	5	16	17	19	20
	mechanics	8	8	8	6	6
	optics	4	6	6	6	6
	total	20	42	50	58	64

Figure 15: Example of committal plan

commitments (sales), the PCP commitments (products to be created) and the people and technology commitments (allocated fte's[2]). Such a plan must be available per program, in this example it is the *Gemini* program.
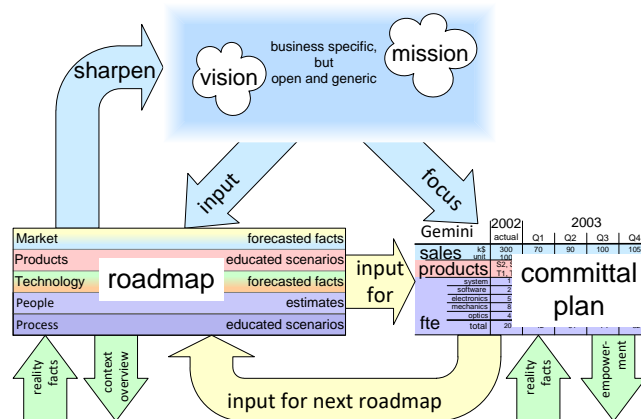
4 Summary

Figure 16: Overview of strategic entities

The mission, vision, roadmap and plan will normally be used as part of the business plan, which is used towards the financial stakeholders of the company. These entities together define the strategy and the deployment of the strategy. Figure 16 shows an overview of the entities which play a role in the startegy process.
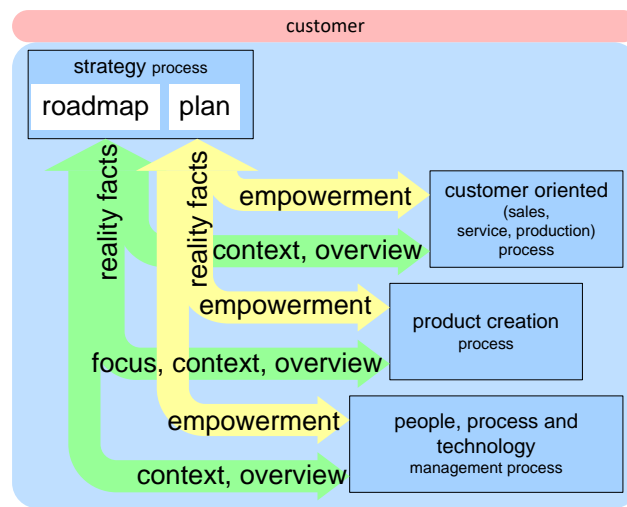
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[2]fte = full time equivalents

Figure 17: Summary of role in business

The value of roadmap for the other processes is to provide context and overview for the specific goal of that process. Especially for the product creation process it also provides focus, the development team can concentrate on the product, which is currently being developed, without discussions of all other alternatives.

The value of the plan for the other processes is that it provides the delegation boundaries, which allows for empowerment. Figure 17 shows the value of roadmap and plan for the other processes. In the opposite direction the other processes should provide the reality facts to be used in next roadmap and plan.

5 Acknowledgements

Philip Bucher asked me for this presentation for the GATIC workshop, which provided me with the right trigger to write this already long ago planned article. Philip also helped by discussing the purpose and content.

References

[1] Gerrit Muller. Product families and generic aspects. `http://www.gaudisite.nl/GenericDevelopmentsPaper.pdf`, 1999.

[2] Gerrit Muller. Roadmapping. `http://www.gaudisite.nl/RoadmappingPaper.pdf`, 1999.

[3] Gerrit Muller. The system architecture homepage. `http://www.gaudisite.nl/index.html`, 1999.

[4] Gerrit Muller. Architectural reasoning explained. `http://www.gaudisite.nl/ArchitecturalReasoningBook.pdf`, 2002.

History

Version: 0.2, date: September 12, 2002 changed by: Gerrit Muller
- added abstract
- added text and diagrams to section "From vision to roadmap to plan and further"
- status changed to preliminary draft
- added example committal plan
- added summary

Version: 0.1, date: September 3, 2002 changed by: Gerrit Muller
- Created, no changelog yet