

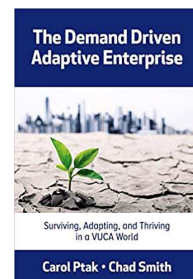
The Demand Driven Adaptive Enterprise

Carol Ptak – Chad Smith

APPENDIX A

Skill Buffers: the missing links

Caroline Mondon



Summary

Why do we need to manage skills in a company? Because they can slow down or even stop the flow when they are missing. This appendix proposes to introduce a fourth buffer in the Demand Driven Adaptive Enterprise, the skill buffer. It defines the Demand Driven Skills Model (DDSM) that enable to decide where to locate and how to size the skill buffers depending on priorities to better protect and promote flow and to innovate. The Demand Driven S&OP process can then configure the Demand Driven Operating Model as well as the Demand driven Skills Model based on the output of the Adaptive S&OP process.

Introduction

Much has been written about how to manage stock, time and resource capacity in the Demand Driven methodology, but what about the people and skills that it takes to maintain and sustain a Demand Driven Adaptive Enterprise?

All companies, whatever their size and type of industry, experience symptoms of flow disruption due to missing skills. The disruption can be more or less significant depending on how often the skills are missing and how long it takes to find an alternative. Disruption can happen because the only skilled person is sick or on leave. It can happen because management didn't anticipate resignation or retirement and didn't organize the transference of the skill. But let us face it, it often happens because sharing skills is perceived as losing power by the expert who thinks that being the only one to master that skill protects against redundancy and the risk of losing their job. Even if that situation may cause a lot of stress and burn out for this owner of this precious skill, the individual may prefer to keep this image of being the only expert of the company rather than to develop another image of ego. This is especially true when the company doesn't have a formalized system to recognize and value the long-time experienced employees who share their skills.

In most companies, the only path to grow in salary and recognition is to become a manager or a leader. Traditionally the manager is the one who is more experienced in the job than the other team members and therefore is paid more. This unique path leads to the well-known "Peter Principle" where the promotion process results in gaining a bad manager and losing a good expert. Many employees help or coach their colleagues because they are naturally generous. But after many years of doing so, if they are not recognized for their contribution, the process improvisation to educate other people results in a general feeling of frustration and disappointment. In such companies, if these employees are ambitious and want to get a raise in salary or recognition, the best tactic is obviously to remain the unique precious skill so that management has no choice but to give a raise in salary with the title of manager that goes with it.

Small or medium size companies where manager or leader positions are very few, have often to deal with a layer of middle management who got their promotion thanks to a general attitude

of super man or woman. Super men or women are managers or leaders who continuously feel the need to prove that they know better than their team members about everything to maintain their power position. This often leads them to extinguish fires that have been self-ignited. For example: they expedite orders because their frozen schedule is not valid compared to actual demand; they cannot keep up with updating it or trying to solve quality problems due to new technical specifications; the validation process is late because it needs their signature to proceed; a new employee doesn't know what to do and is waiting for their instructions; etc.... In such a context, if the company wants to become demand driven, its middle management is often a major bottleneck. This resistance is not because the managers are overloaded but because the management system doesn't motivate them to share their skills. These middle managers or leaders are usually the most attached to the company because their ego is based on their super man or woman image in that particular company. They were seldom given the time to formally acquire new skills because they are constantly overloaded, and they didn't take the time to learn new skills and become certified to demonstrate value in the market the day they want to find another job. They are indeed stuck in a vicious cycle.

Fortunately, in more and more companies, continuous education is transforming companies into learning enterprises. In order to adapt to new technologies and market constraints, education is valued and must be systematically applied. Many governments financially sponsor annual plans of continuous education. But when the employees only know their segment of the overall flow where their skill is relevant they don't really know what the market is expecting because it changes more and more often in a VUCA (Volatile Uncertain Complex Ambiguous) world. Employees cannot guess what order winner is valued by the customer when they have never met any of them. How can they understand the systemic paradigm of the Demand Driven Enterprise Model? How can they contribute to protect and promote flow with the appropriate intuitive actions? In such a foggy context, management can hope to motivate their employees to learn how to improve what they are already doing to contribute to department goals. They indeed get trapped in silos.

The intention of this appendix is to describe the missing links for a systemic continuous learning path for all employees of the company that will enable to address:

- bottleneck of skill in the organization
- guidelines to protect and promote flow at individual level
- vision of the strategic skills priorities to share
- metrics related to skills sharing
- multiple paths to grow in salary and recognition
- win-win relationship between employees and companies for continuous learning
- valuable transition for the most experienced employees and for the redundant middle management.

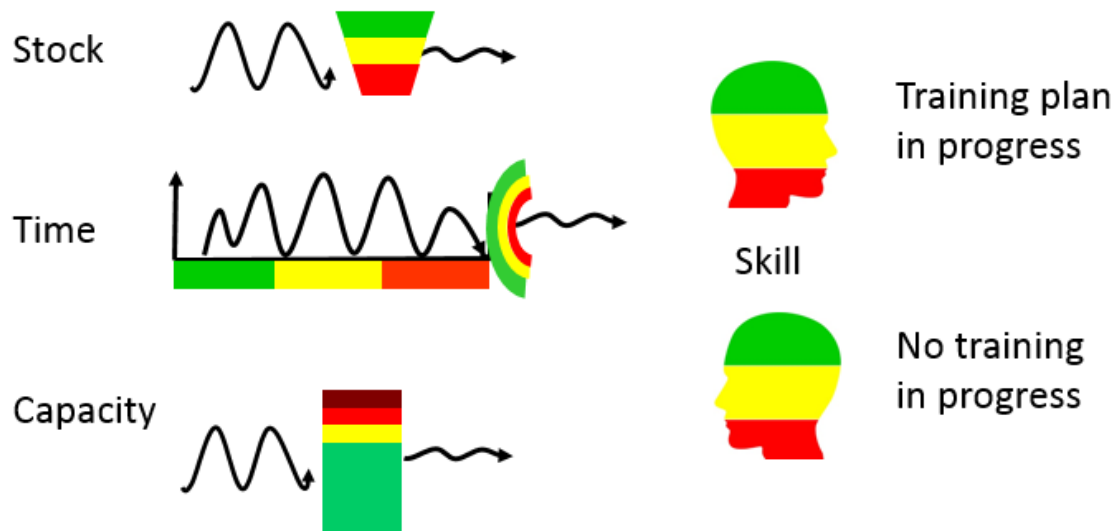
Managing skills with a systemic approach facilitates change toward a Demand Driven Adaptive Enterprise when progress is visible, relevant and valuable for the organization's most important assets; its human capital.

Defining skill buffer

As this book has described it in detail, the first step in a demand driven transformation is the positioning of buffers. These time, stock and inventory buffers, as shown in Figure A-1, absorb variability from both sides and enable the enterprise to sense changes in demand, adapt planning and production and pull from suppliers in real time. But what about the skills required at the different resources? In order to protect against variability due to skills availability, consider a new buffer that is to human beings what a capacity buffer is to machine resources.

A capacity buffer protects flow by providing available capacity to catch up with variability. It is a protective buffer that provides agility and flexibility. The size of the capacity buffer allows both stock and time buffers to be reduced. It requires that a resource maintain a bank of capacity that may often go unused.

Figure A-1 Buffer types and skill buffer



The similarity between machines and human beings stops here. Machines can keep their complete range of capability for a long time, even if not used. Human beings need to exercise their skills frequently to be able to use them efficiently when needed. In Figure A-1 the symbol of the skill buffer, shaped as a human head with the standard green, yellow and red has 2 positions. When the head turned toward the right, it means that a training plan is in progress to maintain continuous development of that particular skill. When the head is turned toward the left, no training is scheduled for that skill.

When an internal trainer is qualified to teach a skill to a student, that also provides the opportunity for this trainer to validate new specifications or process descriptions. The trainer-student team is most of the time the one who have the relevant practical information to validate a process when their manager or team leader have only a theoretical understanding of the constraints. This allows managers to focus on the tactical performance rather than the detailed operational performance.

A difference between the standard buffers and this new skill buffer is the meaning of the three colors. The priority order remains the same.

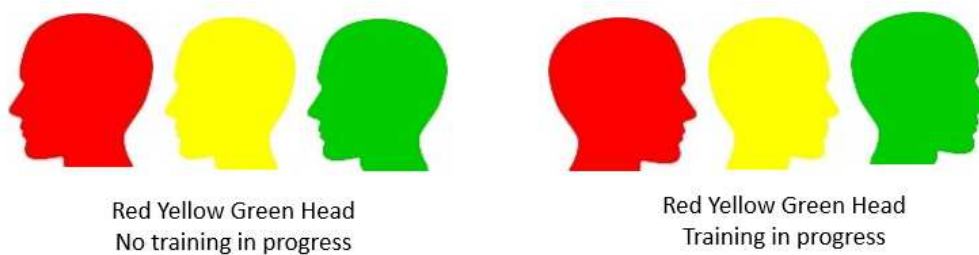
- **Green:** All is good. The quantity and level of skills available are sufficient to face the variability of demand for this particular skill. There are enough employees who can apply the skill; an expert who knows all about this skill, and a trainer who is in the process of teaching to a student or coaching an operationally qualified individual toward expertise on the skill. An employee is operationally qualified when he or she is not fully autonomous but can proceed with at least 20% of the total skill that supports 80% of the activity at the workstation.
- **Yellow:** There is a risk identified because while there is more than one person able to apply the skill, there is insufficient contingency for variability. The legend for this color as well as for the other colors can be adapted depending on the level of maturity of the

company. For example, this level could mean at least one expert who knows all about the skill or a trainer is available. For some skills, operational but not exhaustive knowledge of the skill may be acceptable. A yellow level skill buffer could also mean that insufficient number of trained resources are available to support innovation in the specifications of the product and service or in the process.

- **Red:** The resource capacity is at risk. For example, if there is only one person who know 100% (or even less) of the skill, flow is at risk in the short term. If the skill is only mastered by experts who are not competent to train others, the risk is not immediate but still of concern in the medium or long term. The company may not be able to innovate or adapt to new specifications of the product, the service or the process.

Each of these levels is adapted depending on the situation of the company. Figure A-2 shows how the skill buffer can be symbolized by a colored head. The red head on the left illustrates a critical situation of missing skill, no trainer available and no training plan in progress. If the company decides to train the employee in a public class, the red head will turn toward the right. The green head illustrates a situation where there is a trainer available. If no training is in progress nor scheduled, the green head will be turned toward the left to bring awareness. The symbol of the head is typically used with plain colors.

Figure A-2 Head symbol of skill buffers



Segmenting skills of the company into functions highly depends on the size of the company and on how the processes are distributed among the employees. Companies who start the process of buffering skills will need to define many detailed skills and functions, often in silos, even in the same department. The more the company focuses on protecting and promoting flow, the more detailed skills will be grouped as generic skills as the employees become more and more multiskilled. This evolution simplifies capacity management and therefore scheduling. This enables the company to quickly adapt to changes in the demand.

As an example, at the beginning of the demand driven detective novel “The Missing Links” the two onsite installation workers are specialized in driving the delivery truck for luxury furniture for boats and fancy clothing stores and in installing this furniture on site. At the end of the novel, being able to install the furniture on site is part of the training plan to become “operational woodworker or metalworker”. This was done to provide the opportunity to better understand customer constraints and requirements. Therefore, on site installation and woodwork or metalworker is considered as one skill.

The Demand Driven Skills Model (DDSM)

Now that there is visibility to specific skill buffers, let’s examine how the multiskills matrix can be transformed into a dynamic Demand Driven Skills Model (DDSM). The DDSM enables a company to visualize in real time what are the training priorities to protect flow.

The multiskills matrix is well understood by companies certified ISO9000 because it is one of the requirements. The DDSM builds on this tool to describe the multiskills of all employees, including top management, in order to focus on flow promotion and protection. The DDSM encourage transmission of knowledge, continuous improvement of products and processes and integration of innovations by a team of internal trainers who support and complement the management team.

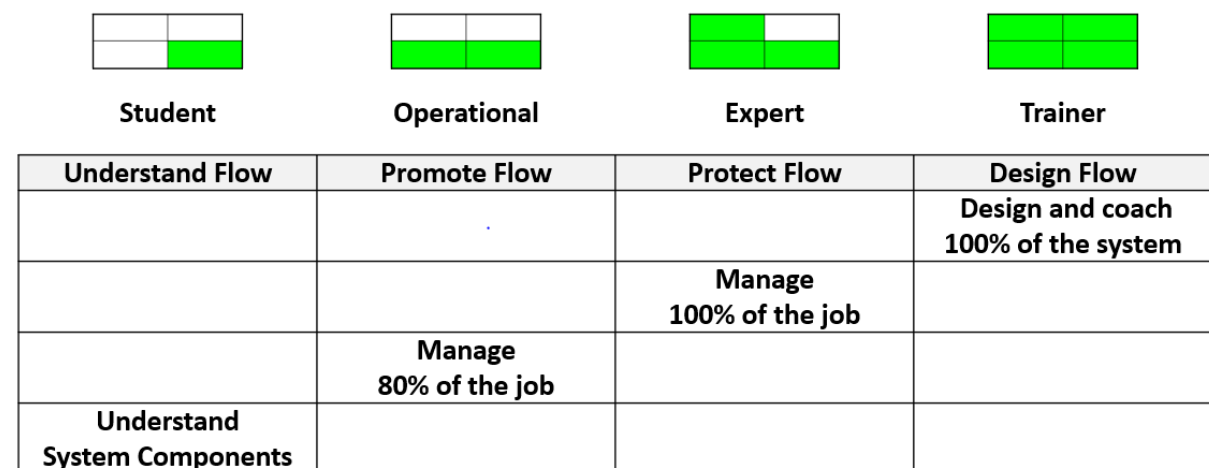
Building the multiskills matrix

How do you describe the level of employee capability to protect and promote flow in your company? Figure A-3 is an example from a manufacturing company of the capability continuum from student to internal trainer. It must be adapted to each company depending on:

- Maturity regarding flow focus / cost focus
- Education on best practices (Lean, 6 Sigma, TPM, TQM, etc...) and understanding on how each can contribute to protecting flow
- Intimacy with customers
- Complexity of the machines and of the technologies used
- Empowerment given to employees and therefore role of the managers and leaders: are they in a supervisor or coach posture?
- Silo thickness between departments like: Finance, Supply Chain, Total Quality,

Each level hereunder builds on the skills of the previous level, so the incremental skills are shown on the diagonal.

Figure A-3 Multiskills Matrix definition of levels



A student is learning about flow and understands the system components:

- Markets, Customers, Product lines, Shareholders, financial situation of the company
- Specifications of the company products and services
- Health and security rules of the company
- Basic Lean methods like 5S and TPM like first level maintenance
- Basic quality control tools

An Operational employee can manage 20% of the total skill that supports 80% of the activity at the workstation and promote flow with the appropriate good practices like:

- Total Quality Management

The multiskills matrix must have the attention of top management to encourage continuous learning and adaptation of skills to the strategy of the company and to the demand of the customers.

Valuing skills sharing

As shown in Figure A-5, dedicating a several meter square space in the plant for the multiskills matrix provides a central location to celebrate new green squares. This is a visible demonstration that the topic is important for the future of the company.

Celebration of new trainers can become as important as celebration of new managers or leaders. When top management provide focus and lead by example, it takes at least one year to change the culture of a company toward valuing skills sharing.

Figure A-5 Example multiskills matrix celebration



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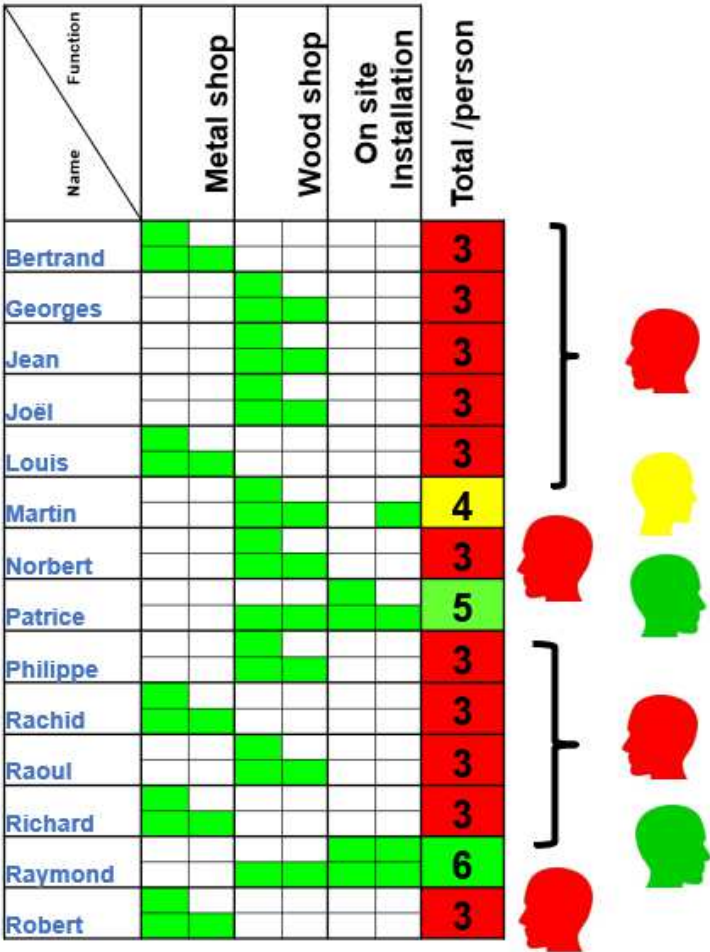
To become an internal trainer, a specific public or in-house training of at least 3 days is required to teach an individual the specific skill necessary to be a trainer. Therefore, at the beginning of the project, no one can be a self-assessed trainer since this training has not been taken. This requirement provides a good way to discourage well known but ineffective internal improvised trainer. For example, people who believe that to explain better you should repeat more loudly.

Typically, a company will add customized days to this training to take into account the specific processes of the company. During these days, the instructor will coach the trainers-to-be to make a presentation of the detailed content of the training he or she designed for their peers. Union representatives are usually welcomed to participate in this process in addition to top management.

During the face to face annual management review with the employees, managers, leaders, or HR must be trained to properly explain the consequences of the missing skill on flow. Priority skills are identified and made visible to inspire career paths. Figure A-6 is an example of a visibility chart that can be used during the face to face annual review process. Note in the figure that not only are the skills insufficient which means the head is red but also the head is

turned to left which communicates that there is not a training plan in place to address this deficiency.

Figure A-6 Multiskills matrix for individuals

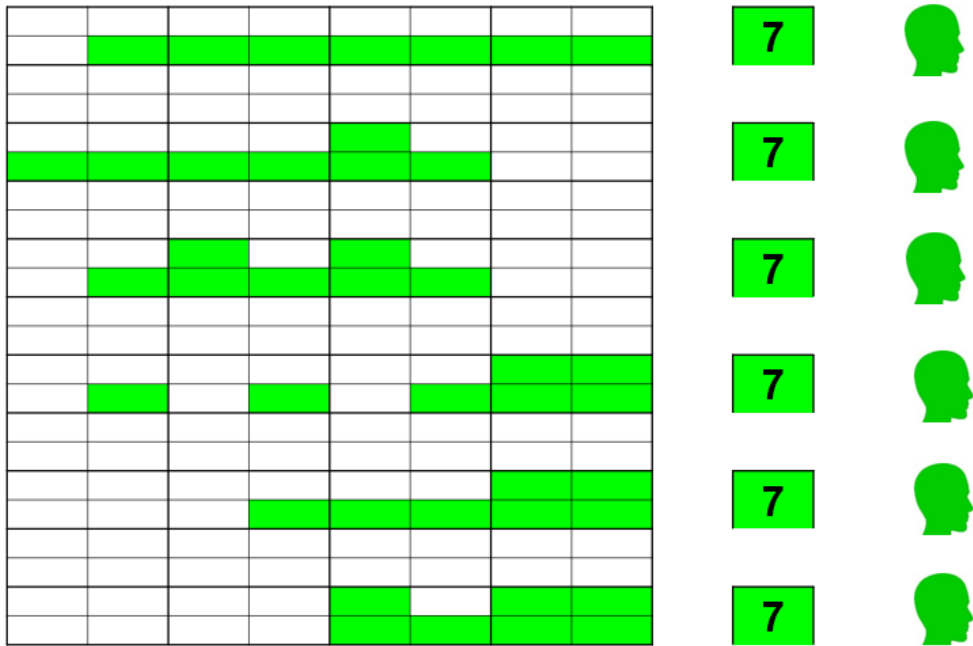


Valuing multiple paths to growth

One of the advantages of using the number of green squares as a new way to value the contribution of an employee is the variety of growth paths it offers employees that can be equally valued. Depending on individual aspirations, several paths can be proposed to new employees or to current employees that will motivate them to stay in the company and grow their talents.

In Figure A-7, all six configurations result in seven green squares for the individual. For example, if the internal trainer is very valuable to a continuous improvement project, a young employee who has some functionality across four functions can rescue a customer order when demand variability is higher than expected.

Figure A-7 Multiskills matrix skill paths example



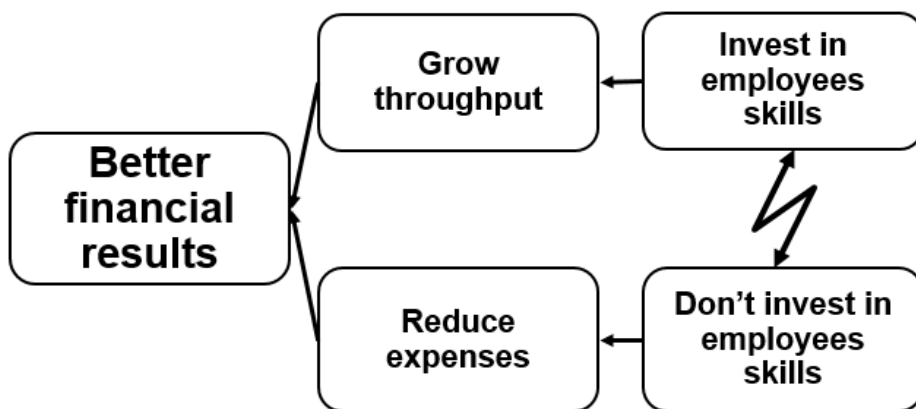
Links between competencies and competitiveness

The ROI of a training can be difficult to evaluate. It's one of the oldest jokes in the business world:

Two managers are talking about training their employees. The first asks, "Yeah, but what if we train them, and they just leave?" The second responds, "What if we don't train them, and they stay?"

All companies looking for better financial results face the dilemma described in Figure A-8:

Figure A-8 Training conflict



They must grow their throughput and at the same time reduce expenses. Growing throughput requires well trained employees and a continuous update of their skills. Reducing expenses cuts into training budgets. As a consequence, companies oscillate between training and not training depending on the manager in charge and other circumstances that either emphasize the pressure to reduce expenses versus adding skills and expanding skill levels. When

trainings are postponed and finally occurs late in the year because of financial reasons, like budget limitations, most probably they will have little linkage to promoting and protecting flow.

Enterprises already engaged in the Demand Driven Adaptive journey understand that a few days of internal or public training will never cost more than the consequences of a break in flow that can cause the loss of a customer.

Therefore, the priority will always be to focus on flow protection and to turn red heads toward the right, that is to say, invest in training a sufficient number of professionals to master 100% of those skills. Eventually some employees will be motivated to become internal trainers for that skill.

But once red heads have turned toward the right and become yellow, how then does a company decide on priorities to schedule the trainings?

The UIMM federation (Union des Industries et Métiers de la Métallurgie), the largest French union of employers, put together a very simple way to formalize priorities in terms of training. A CEO who wants to get subsidies for training employees must answer on one page, the questions in Figure A-9 called the Competency – Competitivity Plan.

Figure A-9 Competency - Competitivity Plan

Competitivity Target		New investment	New Competencies		Training Paths		
Actual	Future		New jobs	Evolution of internal skills	Year n1 to n3	External or internal	Internal trainer

To avoid the traditional silo effect of thinking about competitiveness targets per department, five main transverse processes can be considered instead. Using transverse processes also provides more employee opportunities to become multiskilled between departments and to start new careers in addition to teaching the company to think systemically.

The first two transverse processes are Marketing and Sales, and Supply Chain. The common target of these two operational processes is to protect flow in the current environment to insure proper delivery of orders to customers. The next two processes are Finance and Human Resources. The common target of these two support processes is to promote flow by anticipating the financial and human resources necessary to support the business plan with the relevant investment and skills. The last of the five transverse processes is Total Quality Management. The main responsibility of this transverse process is to formalize all processes of the company in order to guaranty customer satisfaction in safe conditions for the employees. Processes are validated with the use of audits and tactical metrics. The Total Quality function must also be able to adapt processes when necessary to deploy innovation. This is where the team of internal trainers becomes a strategic resource for the company to be able to innovate quickly and safely.

Figure A-10 is an example of what the company H.RAMI, symbolic “heroine” of the demand driven detective novel “The Missing links”, planned for the next 3 years in the transverse process “Marketing-Sales”.

Figure A-10 H.RAMI Competency – Competitivity Plan for the transverse process marketing-sales

Transverse Process	Competitivity Target		New investment	New Competencies		Training Paths		
	Actual	Future		New jobs	Evolution of internal skills	Year n1 to n3	External or internal	Internal trainer
Marketing-Sales	Less than 5% of sales is export with only 1 international customer	New export markets in product lines Croisière and Boutique Target: 33% of export sales with at least 3 customers in 3 years in each product line			Multiskilled evolution of a woodworker (Ivan) into a export salesperson	Year n1 to n3: Business English Year n1: Apprenticing for Ivan Year n2: Export sales manager course	external by phone internal external	Hubert
	Our understanding of market needs, potential customers expectations, and competitors is not sufficient	Clarify order qualifiers and order winners of our products and services Target: Yearly focus customer and prospect group to update order qualifier and winner	CRM software after 1 year of manual monitoring	Bilingual secretary (to back up Yasmina)	Coaching of new secretary	Year n1: Apprenticing for new secretary Year n2: CRM software training for Yasmina and new secretary	internal external	Yasmina

The Competency – Competitivity Plan is most effective if it is succinct. If an executive committee cannot summarize on one page the target of the five transverse processes for expected priorities in term of education, it is unlikely that the employees, the union, the managers and the HR department, will be able to deploy it.

How can we measure progress of the DDSM?

“If You Can't Measure It, You Can't Improve It.” Peter Drucker

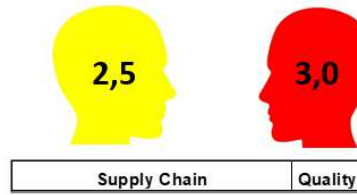
DDSM progress must be visual and intuitive to be attractive and to motivate all employees to maintain it. But if two head symbols are the same color, is it possible to see as easily as in the other DDI buffers, what is the priority? Measurement of progress is made by calculating the average number of green squares by person and per skill after the head symbol has been colored to make priorities visual.

In Figure A-11 the company is looking for the missing skills in the departments Supply Chain and Total Quality-TPM, after assessing the situation per person and per skill in each department to prepare face to face annual management reviews with employees. The calculation of the average number of green squares / skill for the department is obtained by dividing total number of green squares per department / number of skills identified in the department. The highest priority is obvious; flow is at risk because the Total Quality-TPM department has only one skilled employee. If Roger is sick, no one can address a rework that must be expedited for the customer. In addition, there is no internal trainer (4 green squares) in this Total Quality - TPM function. This means that no improvement of the processes of this department is possible as there is no training opportunity. As a result, the priority is to convince Roger to take a trainer course and then to find an employee interested to learn about Total Quality and TPM.

Figure A-11 Example Skill Buffer chart analysis Step 1 Focus on flow

Step 1: Focus on flow

Department	Supply Chain				Quality					
Name Skill	Supply Chain manager	Purchaser	Planner	Storeroom	Total Quality - TPM					
Eric										
Ken										
Léon										
Roger										
Thierry										
	0	1	2	0	1	1	2	0	1	0
	0	1	1	0	1	1	3	0	0	0
Number of square	5	8	10	12	3					
Number of skills	2	3	4	5	1					
Average per skill	2,5	2,7	2,5	2,4	3,0					
Average per department	2,5				3,0					



Color legend:

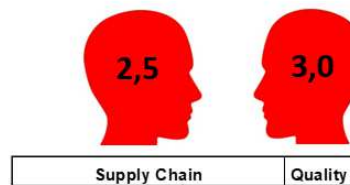
- > 2 people per function including:
1 trainer + 1 expert
+ 1 student or operational
- > 1 person per function
- Only 1 person per function
Or no trainer nor expert

Figure A-11 demonstrates Step 1: focus on flow. It is clear that in the purchasing function, flow is not at risk as two employees, Léon and Thierry, both experts with three green squares, can manage 100% of the job. One employee, Ken, is operational for 80% of the job (two green squares) but there is no internal trainer mastering this skill. Therefore, this operational employee is not going to evolve quickly and there is no continuous improvement happening nor future opportunities to implement innovations while teaching this skill.

Figure A-12 Example Skill Buffer chart analysis Step 2 Focus on flow and innovation

Step 2: Focus on flow and innovation

Department	Supply Chain				Quality					
Name Skill	Supply Chain manager	Purchaser	Planner	Storeroom	Total Quality - TPM					
Eric										
Ken										
Léon										
Roger										
Thierry										
	0	1	2	0	1	1	2	0	1	0
	0	1	1	0	1	1	3	0	0	0
Number of square	5	8	10	12	3					
Number of skills	2	3	4	5	1					
Average per skill	2,5	2,7	2,5	2,4	3,0					
Average per department	2,5				3,0					



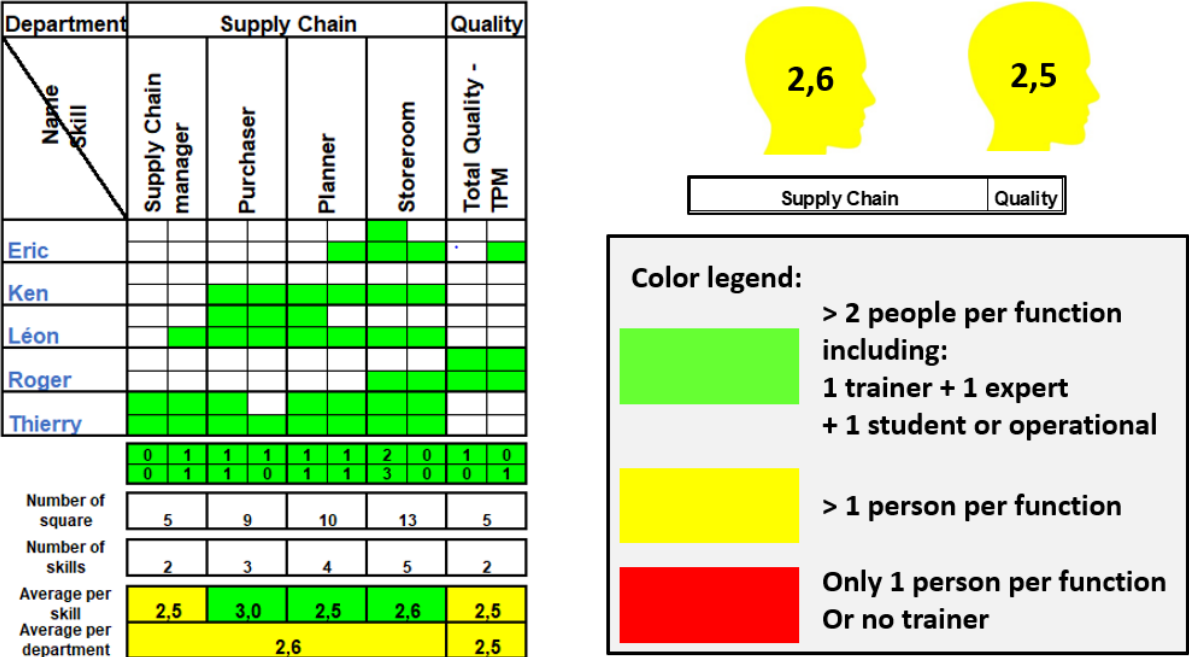
Color legend:

- > 2 people per function including:
1 trainer + 1 expert
+ 1 student or operational
- > 1 person per function
- Only 1 person per function
Or no trainer

Figure A-12 demonstrates Step 2 Focus on flow and innovation. Now the company wants to focus on flow and also on innovation. To reach that goal, the red legend has evolved from asking for trainer or expert to asking for trainer only. Therefore both the Supply Chain and the Total Quality-TPM departments get red heads that both drive attention when deciding on priorities for the training plan. Imagine that Léon becomes a trainer in purchasing and coaches Ken to become an expert. The purchase function can then be empowered by management to take initiatives. The purchasers' manager, Thierry, will save time that he can invest in becoming a trainer in the Storeroom. If Roger become trainer in Total Quality-TPM and trains Eric, the updated metrics are shown in Figure A-13.

Figure A-13 Example Skill Buffer chart analysis Step 3 Focus on flow and innovation

Step 3: Focus on flow and innovation



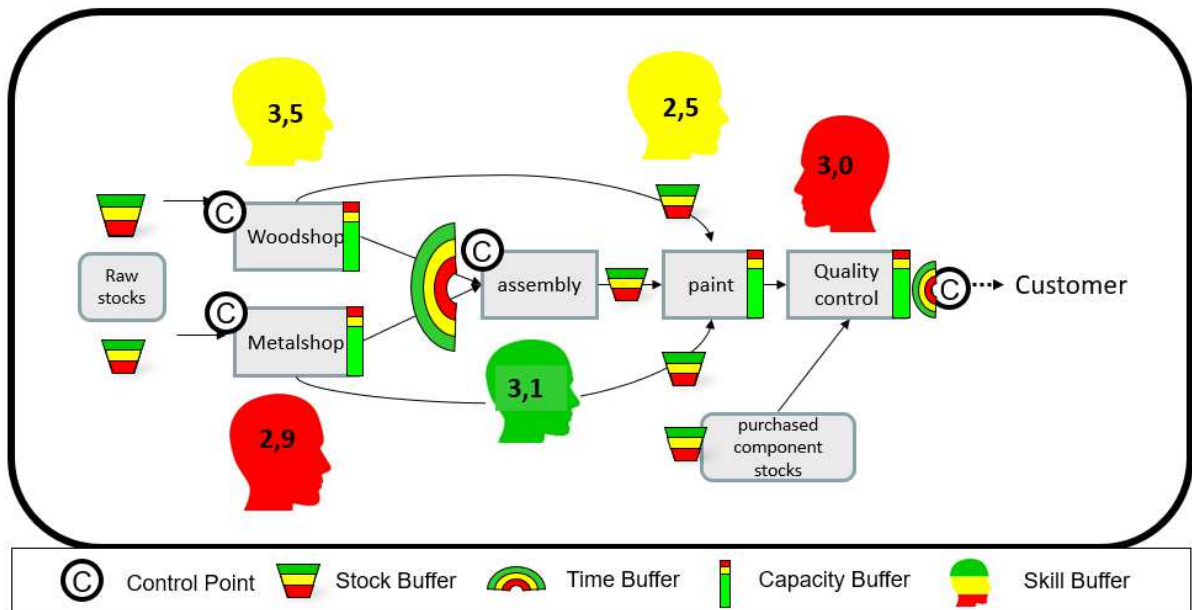
The priority goes to the lower yellow number: the Total Quality-TPM department. If Roger is away, the student Eric will only be able to alert management about problems. In the Supply Chain department, if Thierry is away, the team has now enough trainers and experts to be able to react to variability without their manager's approval because they are skilled and autonomous.

Using DDS&OP to link Adaptive S&OP and DDSM

Strategic positioning of skills

Once all employees are comfortable (and proud) with green squares in the multiskills matrix and when the education plan to achieve the competitiveness targets is clearly described in the Competitivity – Competency Plan, then the skill buffers model can be displayed as shown in Figure A-12 to communicate the overall operational schematic with respect to strategy.

Figure A-14 Demand Driven Operating and Skills Model



In this Demand Driven Operating & Skills Model using the example described in this appendix, the skills priorities to train employees to protect flow are:

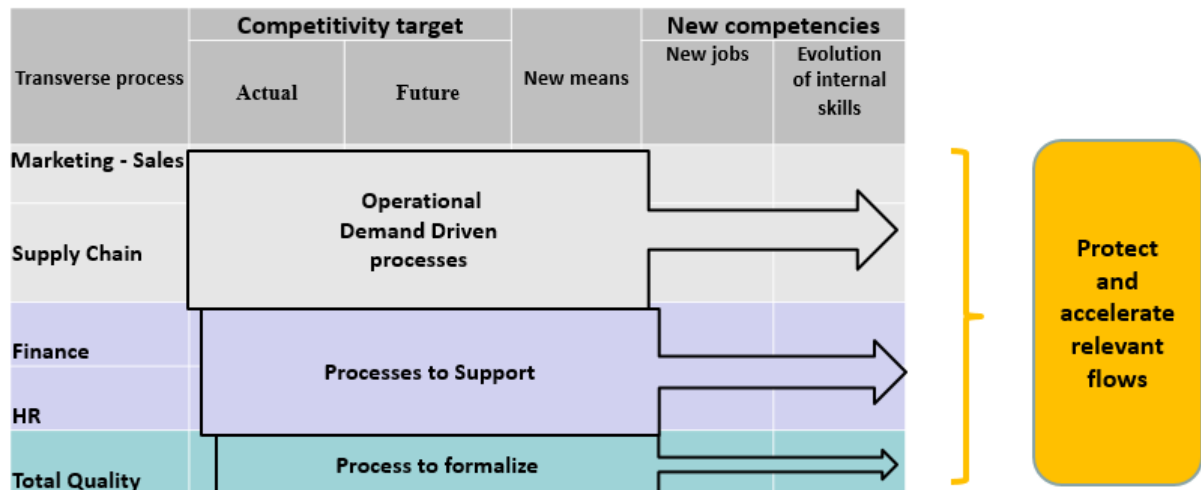
- 1) Red head in Quality control that doesn't have yet a training plan in progress.
- 2) Red head in Metalshop where there is obviously no trainer available, but an external training is in progress
- 3) Yellow head in paint where the number of skill / person is lower than in other department. That is because the number of people able to paint is small
- 4) Yellow head in the woodshop with a higher skill / person
- 5) Green head in assembly is the lowest priority even if the skill / person is low because flow is protected by an expert and one trainer who is actively training new employees

Adapting the DD Skills Model

The mechanism that allows the complete Operating Model, including skills to adapt to strategic decisions communicated by the business plan, is the DDS&OP process. This bi-directional tactical reconciliation hub defines and communicates the master settings for the DDOM; it can now with the DDSM also identify missing skills and decide the allocation of training resources to better protect and promote flow and to welcome innovation.

Once the managers of the company are clear about the missing skills per department and understand that education is the first step toward protecting and promoting flow and toward adapting to the market, the CEO can ask them to show the progress of their training plan during the Adaptive S&OP process. Figure A-13 shows the role of each transverse process of the Competitivity - Competency Plan to protect and promote flows. The Marketing-Sales process as well as the Supply Chain process are the operational processes; the Finance and HR transverse processes are there to support the operational ones; the Total Quality process role is to formalize all processes.

Figure A-15 Contribution of Competency – Competitivity Plan to protect and promote flows



In the DDS&OP agenda, evolution of skills needed to protect flow is described by the manager owner of the operational transverse processes with the metrics of the DDSM the same way they are used for the other buffers of the DDOM. The S&OP committee can decide as a team, with the support of their members from the Finance and HR departments who studied the ROI of the trainings. They can provide data and explain where to allocate resources for trainings as a priority. This means the end of the perpetual postponement of training experienced by many companies. When the process evolves and integrates new skills, the Total Quality department can validate these new skills when formalizing the new processes. The more internal trainers available, the quicker the company can adapt to innovation, hopefully before their competitors.

Summary

Why do we need to manage skills in a company? Because they can slow down or even stop flow when they are insufficient or missing. This appendix introduces a fourth buffer in the Demand Driven Adaptive Enterprise Model (the skill buffer) and defines the Demand Driven Skills Model (DDSM). The DDSM enables a company to decide where to locate and how to size the skill buffers depending on strategic priorities to better protect and promote flow and for successful innovation. The Demand Driven S&OP process can then configure the Demand Driven Operating Model as well as the Demand Driven Skills Model based on the output of the Adaptive S&OP process.

ⁱ The Peter principle is a concept in management developed by Laurence J. Peter, which observes that people in a hierarchy tend to rise to their "level of incompetence".