

Resumen (Español)

En esta memoria se describe un proyecto Seis Sigma realizado para el negocio de HP BPO. Mas en concreto para el proceso financiero de rembolso de gastos de viaje de empleados de HP en la región de EMEA (Proceso de T&E-EMEA).

El objetivo de este proyecto era ayudar al proceso de T&E a alcanzar sus objetivos para el año fiscal 06 establecidos en la “FY06 T&E Balanced Scorecard”. En particular el proyecto pretendía impactar directamente al area financiera de la “Scorecard” aportando unos ahorros anuales de al menos \$8600/año y al area de cliente aportando una reducción de escalaciones de clientes y un aumento en el índice de satisfacción del cliente (VOC score).

Este proyecto se realizó siguiendo la metodología Seis Sigma DMAIC: “Define, Measure, Analyze, Improve, Control”. Previamente a la realización del proyecto todos los participantes recibieron la formación necesaria en un curso de “Green Belt” impartido internamente en HP BPO. La memoria describe detalladamente los pasos seguidos en cada una de las fases pudiendo así servir al lector como modelo para la realización de otro proyecto Seis Sigma DMAIC.

Los resultados obtenidos en el proyecto descrito en esta memoria fueron superiores a los inicialmente previstos alcanzando una reducción de defectos del 79%, un ahorro anual superior a los \$13000/anuales y una reducción de escalaciones de cliente del 79%. La cuantificación del impacto de este proyecto en el aumento del índice de satisfacción del cliente (VOC score) queda fuera de esta memoria.

Finalmente esta memoria presenta una serie de reflexiones acerca de la metodología/cultura Seis Sigma. Por un lado se presentan tres razones que hacen de Seis Sigma una cultura útil para un negocio: provee al negocio con una herramienta para cuantificar las mejoras realizadas en los procesos, mejora la relación con el cliente al atacar los defectos y crea una mentalidad de mejora continua y compromiso en todos los niveles de la empresa. Por otro lado se presentan factores críticos para alcanzar una implementación satisfactoria de la cultura Seis Sigma en un negocio: el compromiso de los directivos y el rol motivador (de líder) de los Black Belts (BB) y Master Black Belts (MBB).





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1. Glossary

- T&E: Travel and entertainment
- EMEA: Europe, Meddle East, and Africa.
- TRAMS: Reimbursement application used by HP.
- VOC: Voice of the customer.
- CTQ: Critical to quality.
- TER: Travel expense report.
- BPO: Business process outsourcing.
- DPMO: Defects per million opportunities.
- DPU: Defects per unit.
- DPO: Defects per opportunity.
- DMAIC: Define, Measure, Analyze, Improve, Control.
- GHRMS: Global Human resources database.
- SIPOC: Suppliers, Inputs, Process, and Outputs.



2. Project Background

2.1. Introduction to HP BPO

Today's business world is marked by change, complexity and the need to rapidly adapt to new market demands without losing momentum on strategic objectives. Successful companies create lean organizations that focus on their core competence and outsource or partner for activities that are not strategically critical and not essential to differentiating the company. Typically these activities include the transactional and tactical points of finance and accounting, human resources, procurement, and sales and marketing.

In particular, companies look to Business Process Outsourcing (BPO) to:

- Focus management attention on strategic issues rather than low value-add transactional activities.
- Reduce operating costs by outsourcing to service providers who can take advantage of labor arbitrage, better IT systems and improved scale.
- Improve financial controls and regulatory compliance.
- Increase the speed and quality of business processes, leveraging a provider's expertise, best practices and continuous quality improvement.
- Increase operational flexibility and minimize use of capital.
- Enrich processes with modern technology and tools.
- Enhance transparency of operations.

Outsourcing non-core activities frees up capital, people and technology, allowing the companies to concentrate on their core business and to increase the agility of their operations. Often, cost savings of up to 50 percent can be achieved while at the same time improving the quality of the processes. With BPO, a company can become a leaner, more Adaptive Enterprise.

Many industry-leading companies like Procter & Gamble, Nokia, Ford and Aventis have started to outsource part of their operations. Those companies that do not recognize the new business imperative of focusing on what is core to their business and outsourcing the non-core activities risk being left behind in the race for increased competitiveness.



Engaging in Business Process Outsourcing is a major transformational challenge for any organization. It requires a partner who understands the business requirements, who has experience in managing processes to world-class performance levels and who has the flexibility to respond to the specific needs.

HP has been ranked by outsourcing consultancy EquaTerra as the 1st BPO provider—a company able to effectively manage long-term complex services. Few players in the market today can provide the level of process excellence, depth of outsourcing experience and world-class IT expertise that HP brings to the market in its BPO service offerings. HP has more than 15 years of experience in creating superior operational back-office solutions. Over the years, has continuously improved and professionalized his process capabilities and invested in leading-edge enabling technologies.

Today, HP is one of the world's top six outsourcing service providers. HP provides professional advice and solutions to his customers on all levels of their operations, from business processes to technology infrastructure. By combining his expertise around infrastructure, applications and processes, HP is able to provide integrated, effective business solutions that are robust and reliable and that generate immediate bottom-line impact.

HP provides end-to-end business services, consulting advice, transformation, transition, web services and continuous improvement. HP aims to be a business partner in all issues related to optimizing the business operations through outsourcing.

At the core of our BPO offering HP provides the following business services, either in part or in their entirety:

Finance and accounting—accounts payable, accounts receivable, time and expense administration, fixed assets management, general ledger, project accounting, and reporting.

Order-to-cash CRM support—customer administration, order processing, credit analysis and approvals, billing and invoicing.

Order-to-cash revenue cycle services—revenue, collections, dispute resolution, cash application, reconciliation and reporting.



Procure-to-pay procurement support—supplier administration, PO processing, P-card administration.

Procure-to-pay payment services—accounts payable, invoice processing, PO matching, credit returns.

HP consistently surpasses world-class industry benchmarks in process efficiency and leverages its position as an industry leader in imaging, printing and workflow solutions. HP's dedicated quality team uses Six Sigma methodologies to continuously improve his process performance. HP employs more Six Sigma trained experts than any other provider, except for GE and Wipro.

HP has one of the world's strongest global service delivery organizations. With Global Business Centers in India, China, Singapore, Mexico, Costa Rica and Spain, and with more than 4,500 process experts worldwide, HP can cost-effectively and reliably provide services where the customer needs them, when he needs them—around the globe, 24 hours a day.

HP Global Business Centers are further supported by local operations in more than 50 countries, providing the customer with a ready-built network for future expansion. Given HP global presence, his trained staff can support business operations in over 30 languages. Last year alone, HP processed more than 130 million transactions for customers worldwide.

HP business model has been designed for rapid scalability and robustness. Today, HP can scale up operations with several hundred additional employees each week when customer operations require it. Meanwhile, HP's global delivery model minimizes the risk of downtime due to local disturbances. HP can quickly shift operations to help the customer achieve the highest business continuity. In short, HP has the global coverage and capability to meet the customer needs and to respond quickly to changes in scope and scale of operations.



2.2. Introduction to the T&E process

The T&E process is one of the multiple standard processes in HP BPO solutions portfolio.

The T&E process is the financial process designed to manage all employees' travel and business entertainment expenses. Currently several companies have adopted the solution described in the next lines:

All employees in the company have a Corporate Card linked to their personal account. There are two characteristics that make this card different to a standard credit card:

- All expenses incurred with this Company card are directly charged to the employee's personal bank account two months after the expense date.
- There is no credit limit in these cards. In case the employee is not responding for the expenses the company will be responsible.

When an employee is traveling he should pay all his expenses with this card. At the end of the trip, or during the trip if desired, the employee should report to the company all the expenses paid with the Corporate Card. The company then will verify that all the reported expenses are within the travel policy of the company. If everything is ok in this check the employee is reimbursed the reported amount. Normally this check and reimbursement process doesn't take more than 6 working days so the reimbursement is done prior to the charge of the expenses by the company card (two months after the expense date). In case the expenses are not within the policy, they are not reimbursed to the employee resulting in a negative balance for him when the Corporate Card charges the expenses.

If this solution is implemented is critical ensure a smooth check and reimbursement processing so the employee is reimbursed **before** the expenses are charged in his personal account. This project described in this paper aims to improve the smoothness of the reimbursement process as implemented for the HP EMEA region.



2.3. Project Justification

2.3.1. Use of a Balanced Scorecard

Each fiscal year senior management establish the strategic objectives for the Barcelona Share services center in the **Barcelona Center Balanced Scorecard**. This scorecard contains four different types of objectives: financial objectives, Operational excellence objectives, Customer objectives and innovation objectives.

Overall Status						Prior Period Status			FY 05		Report Date			Center Manager name			
My Balanced Scorecard: Center Manager																	
1.0 - Financial						2.0 - Operational Excellence											
#	Objective	Measure	Actual / (Target)	Owners	End Date	#	Objective	Measure	Actual / (Target)	Owners	End Date	#	Objective	Measure	Actual / (Target)	Owners	End Date
3.0 - Customer						4.0 Innovation											
#	Objective	Measure	Actual / (Target)	Owners	End Date	#	Objective	Measure	Actual / (Target)	Owners	End Date	#	Objective	Measure	Actual / (Target)	Owners	End Date
Red Yellow Green																	

In order to achieve the center objectives the center manager cascades these objectives into the different processes. For the T&E process the FY objectives are stated in the **T&E Process Balanced Scorecard**. All the T&E team should be aware of these objectives. *All the improvement activities initiated by the T&E team should be aligned with the T&E process Balanced Scorecard* ensuring that all the resources are invested according to the business needs.

2.3.2. Linking the project to the T&E Process Balanced Scorecard

Note: Process objectives are not stated due to confidentiality restrictions.

As mentioned in the previous lines before starting any project the project lead has to make sure that the contribution of this project is aligned with the business needs. If the project benefits are matching with the process objectives then the project lead can proceed for a project proposal and look for a project sponsor.

The goal of this project is to reduce by 50% the number of rejected reimbursement payments.



This will have a direct impact in two areas of the T&E Process balanced scorecard:

-Impact in the **Financial area**: By reducing the number of Rejected payments the number of Manual payments will be reduced resulting in a financial saving for HP, as Citibank charges \$16 for each Manual Payment processed. The yearly cost due to Manual payment considering 50 weeks in a year is estimated around \$17000.

-Impact in the **Customer area**: By reducing the number of Rejected payments customer satisfaction will be increased.

As part of the Quality Management system implemented in the T&E process, a Voice Of the Customer survey (VOC) is run every 6 months for the main external segments of customers. The last VOC run prior to this project for the customer segment “HP employees” confirmed accuracy of payments as one of the main CTQs (critical to quality).

This VOC was conducted in September 05 and its results are presented in the following table:

	BASE	Dec-04	May-05	Sep-05
CTQ's	On time Reimbursement	3.36	3.61	4.34
	Accurate Reimbursement	3.15	3.26	3.31
	On time queries resolution	3.26	3.48	3.81
	Accurate queries resolution	3.27	3.34	3.60
	Overall Performance	3.32	3.73	3.93
	Overall Rating	3.32	3.73	3.90
5 = excellent - 1 = poor				

The lowest rating was given to the CTQ “Accurate Reimbursement”. VOC score for this CTQ is below the target established in the T&E Balanced Scorecard. Comments from customers rating 1 (Poor) or 2(Nearly Poor) on this CTQ where all addressing to the same issue: “Rejected Payments”. From the eyes of the customer perspective this frustration is easy to understand: Rejected payments are not recognized by the Reimbursement application “TRAMS”: once a the travel expenses claim has been released for payment the status in the application will change to PAID. If payment is not successful (rejected payment) status will change anyway. This will create confusion in the customer, as the application will tell him that the claim was paid when it was actually rejected and put in a queue for manual processing.

As this project is perfectly aligned with the business needs it made sense to come up with a project proposal and look for a sponsor that will provide us with the appropriate resources.



3. Introduction

The project described in this paper is a Six Sigma DMAIC improvement project for the HP EMEA T&E reimbursement process. All EMEA legal entities with automatic reimbursement payment via Citibank are in the SCOPE.

The goal of this project is to reduce by 50% the number of rejected reimbursement payments.

This reduction will have a direct impact in two areas of the T&E Process balanced scorecard helping the process to achieve his FY06 quality objectives:

-Impact in the **Financial area**: By reducing the number of Rejected payments the number of Manual payments will be reduced resulting in a financial saving for HP, as Citibank charges \$16 for each Manual Payment processed. The yearly cost due to Manual payment considering 50 weeks in a year is estimated around \$17000.

-Impact in the **Customer area**: By reducing the number of Rejected payments customer satisfaction will be increased.

The project described in this project follows the Six Sigma DMAIC methodology: "Define, Measure, Analyze, Improve, Control". Prior to running the project the team was trained in the Six Sigma methodology by having a two weeks Green Belt training.



4. Define Phase

4.1. Goals and outputs

The goal of the Define step is to define the project's purpose and scope and obtain background information about the process and its customers.

The main output of Define is a clear statement of the intended improvement: **The project charter**. A well-defined project charter should be a **one-page document** containing all this elements:

- A team chart.
- A clearly defined problem statement.
- A clear project goal.
- All customers impacted by the problem (Internal/External).
- All CTQs by customer segment that the project will improve.
- A raw estimation of the improvement of each CTQ. (This estimation can be reviewed after the measure phase).
- A clear definition of the scope of the project.
- Timeliness for the completion of each phase+ deliverables.
- All the risks and dependencies that can impact the completion of the project.

4.2. Developing the project charter

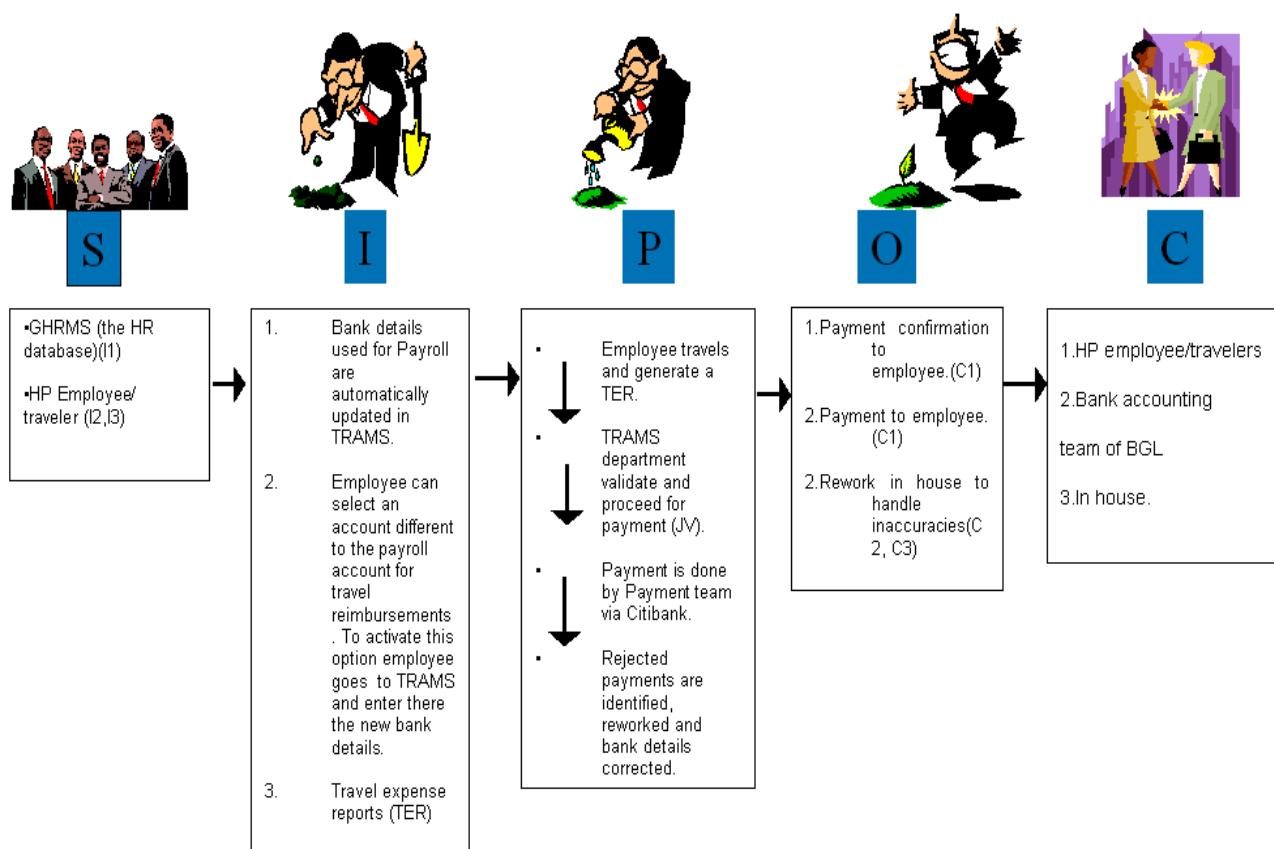
In order to come up with all these elements I, as a project lead, proceeded as described below:

1. *Engaging the team:* the first thing that I did as a project lead was identifying the best players for the team. Different profiles were required: a person with deep knowledge in the day to day T&E operations, a person with technical skills (Reporting tool and Reimbursement application), a person within the payment team (Bangalore) and a person in the Customer Response Center with knowledge in the T&E queries. A



total of 4 people plus the project Lead. Once identified the challenge was to engage them in the project. Good interpersonal skills are required to be successful in this task. Type of motivation of the people involved is critical: In this case all the team members were just graduates really motivated in learning new things. They were enthusiastic of getting involved in a Six Sigma DMAIC project. From the very beginning the team saw the value of the project and was fully committed. Also I needed to involve the most critical player in the team: **the Black Belt.** The black belt is a full time-time person dedicated to lead and mentor Six Sigma projects. For this project he provided coaching and expertise in using the Six Sigma tools.

2. *Creating the process SIPOC+ high-level process map:* Identify Suppliers, Inputs to the process, main steps in the Process, Outputs of the process and Customers. The SIPOC was developed in a group session of around 2 hours. The process map was developed in a group session of around 4 hours. The complete team and the Black Belt participated in both sessions. In the following charts you can see the process SIPOC and the high-level process map:



Suppliers and Process Inputs

GHRMS (the human resources database) automatically loads twice a week the employee's personal details (including the Payroll bank account) in the TRAMS application.

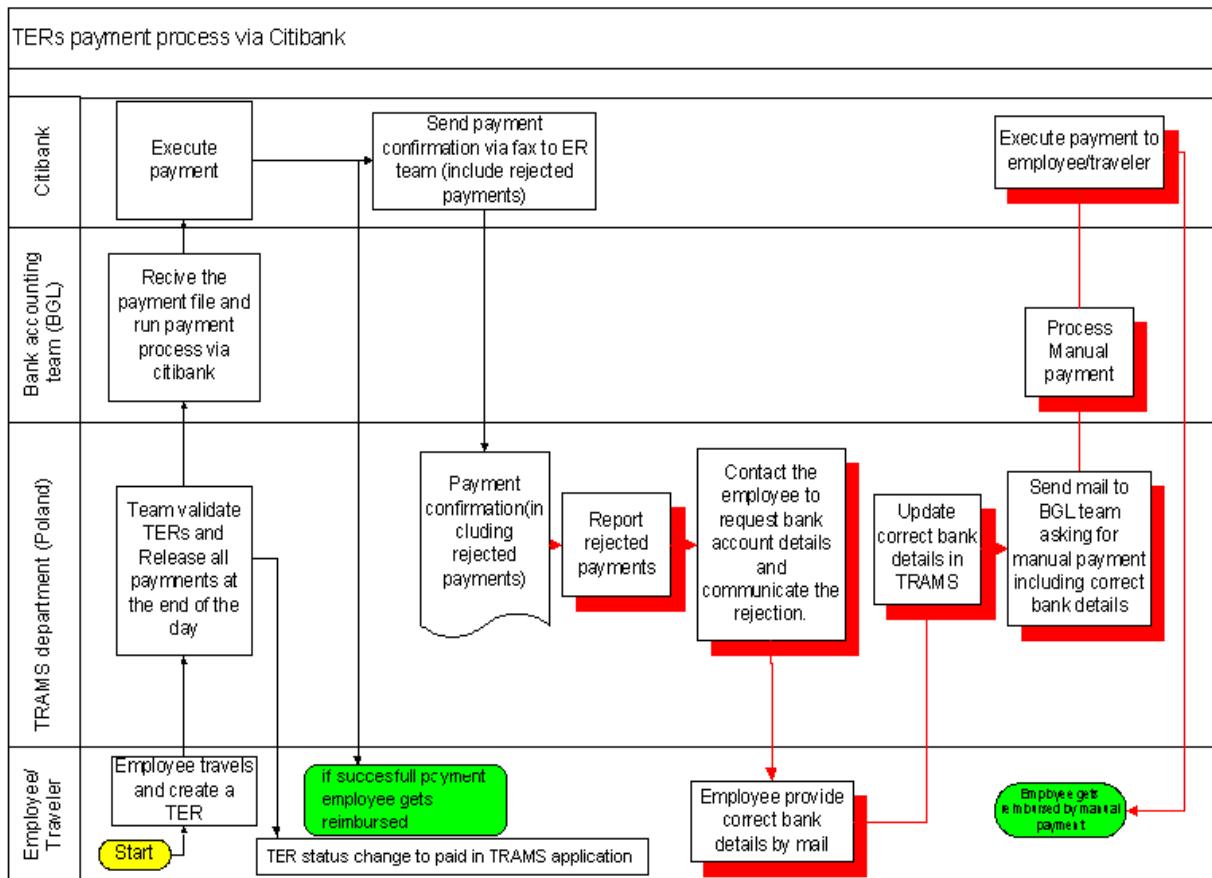
If desired, the employee can manually set up in the TRAMS application a bank account different to the payroll bank account.

Also, after a business trip the employee reports his travel expenses in the TRAMS application generating a TER "Travel Expense Report".

Customers and Process Outputs

External customers: HP employee receives the reimbursement notification (status displayed in the TRAMS application) and the reimbursement itself.

Internal customers: HP BPO (T&E team+ Banking team) receives a set of payments that have to be reprocessed. These defective payments have an associated cost (\$16/unit + the time dedicated to reprocess them).



Main steps in the T&E Process

During a business trip, the HP employee pays in advance his expenses using an AMEX corporate card linked to his personal bank account. After/during the business trip, the HP employee reports his travel expenses in an application called TRAMS which generates a TER "Travel Expense Report". This TER, together with the original receipts, is physically sent to the TRAMS team who validates it against the EMEA travel expense policy. All the expenses that are within the policy are released for payment. If there is no problem in the payment process, the total amount claimed in the TER should be reimbursed to the employee before AMEX charges him the incurred expenses.

The problem is that sometimes payments are not successful. **Some payments are rejected by Citibank's automatic payment process while the status in TRAMS application displayed to the HP employee is "status paid". Currently the process generates a total of 1075 rejected payments/year. These rejected payments (defects) are reported to HP in a daily basis by Citibank. Defective payments are manually reworked while the status of the TER displayed in the TRAMS application to the employee remains "status paid". Cycle time for manual processing can take more than one week (mean 5 days, Span 10). This mismatch between the status displayed in the application and the real status leads to customer dissatisfaction. Also each of these defective payments have an associated cost of \$16 charged by Citibank + the cost of reprocessing time.**

The goal of this project is to reduce by 50% the amount of rejected payments.

3. *Understand customer CTQs (Customer requirements of the process outputs) and how the project will improve them:*

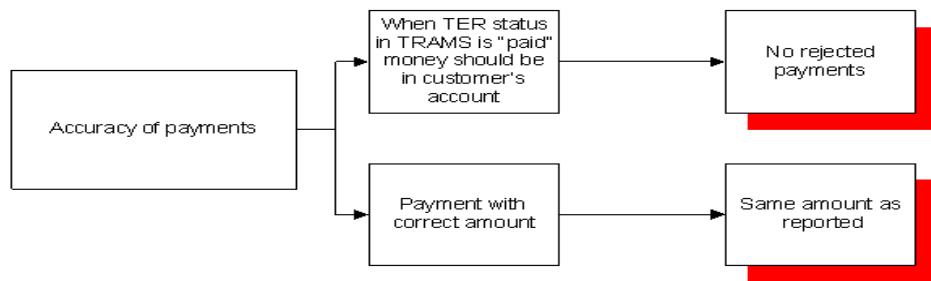
CTQs for External customers: HP employees

These CTQs are known from previous VOC surveys. CTQs in this process for HP employees are:

- **On Time Reimbursement**= Reimbursement done within 6 working days from the moment the TER is created in TRAMS application. This CTQ is related to output number 2 "Reimbursement to employee".



- **Accurate Reimbursement (see CTQ tree)=**



Two things are expected in terms of accuracy. First that the amount paid equals the amount reported. Second that the status of payment displayed to the employee in TRAMS application matches with the real status of the payment. As explained before the second requirement is not met when the payment is rejected.

The project will improve both of these CTQs. By reducing the number rejected payments the number of HP employees reimbursed on time and accurately will be increased.

Before starting the project an average of 15 complaints per month were received due to rejected payments. **Normally by reducing rejected payments by 50% the number of complaints per month due to rejected payments should decrease at least to 8.**

CTQs for Internal customers: T&E team & Banking team.

After discussion with the managers of T&E and Banking teams their requirement was clear: **No rework as an output of the process.** The project will directly improve this CTQ. Note that each rejected payment has an associated cost of \$16/unit + the time dedicated by both teams to the rework. By reducing the number of rejected payments the amount of rework will be decreased. Also the costs associated to this rework will be decreased. **A reduction of 50% in rejected payments means savings to HP BPO of \$8600/year (amount currently paid to Citibank because of rejected payments).**

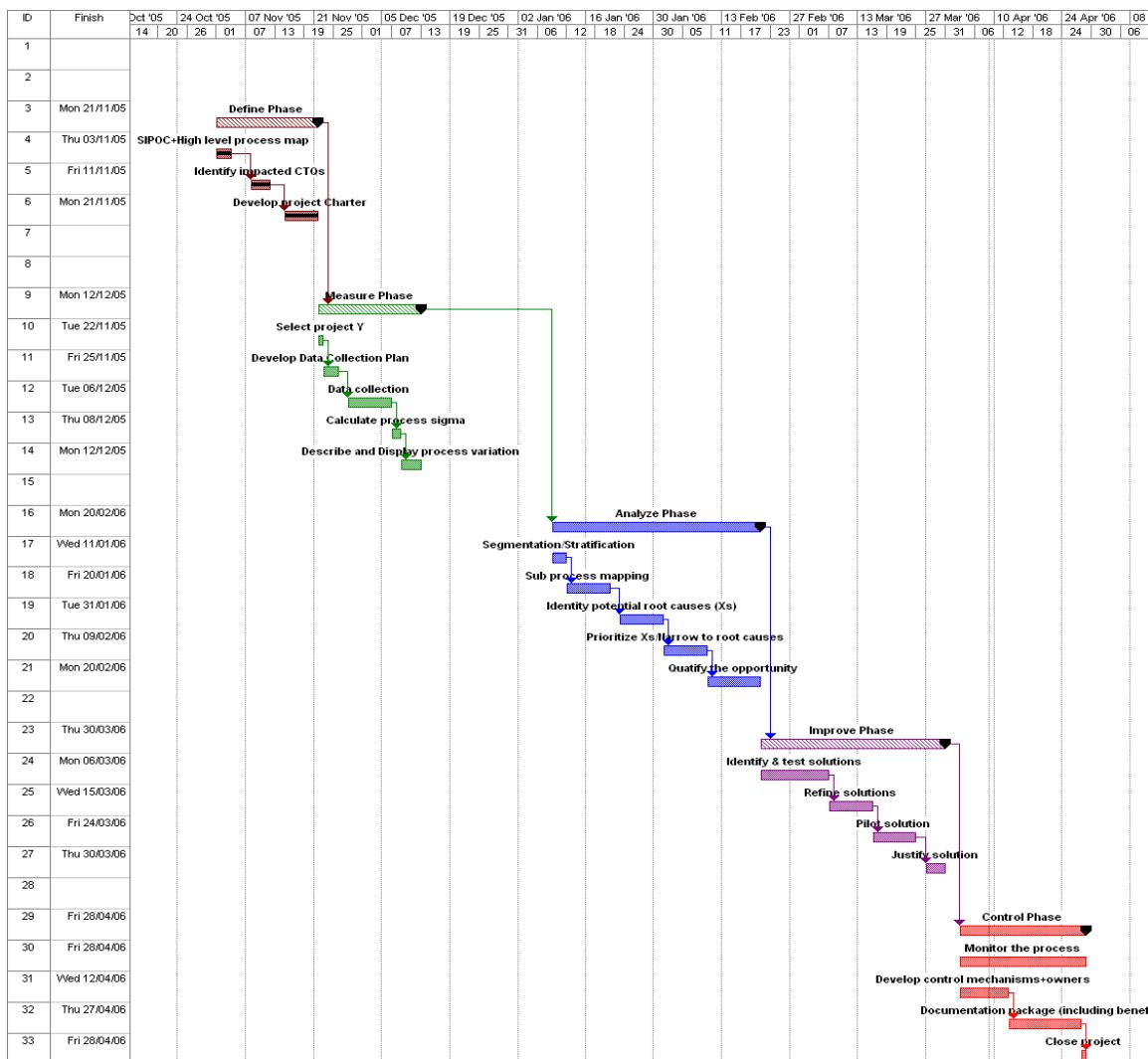
4. *Clearly define what is in the Scope of the project and what is out of Scope of the project:* The following table shows all the Legal entities supported by T&E EMEA process:

Region EMEA	Country	Entity	Company Code
	Austria	71, M6	AT00, BE20
	Belgium	JM	LU30
	Luxembourg	83	DK00
	Denmark	31	FI00
	Finland	63, 81	FR00, FR40
	France	83, B6, 60, EY, NC, LS	DE50, DE00, DE00, DE60, DE98, DE96
	Germany	L3	CH10, CH70, CH11
	Portugal	57, E8, 13	GB10, GB40, GB92
	Switzerland	80, C6, MD	IE20, IE00, IE98
	UK	R5, 72, AU, Mw	IT00
	Ireland	82, P5	NL00
	Italy	95	NC00
	Netherlands	92	
	Norway		
Dubai	DM	A200	
Spain	F9, 70	ES00, ES30	
Poland	61, R0	PL00, PL10	
Republic South Africa	70, R0	ZA00	
Hungary	M5	HU00	
Greece	O9	GR00	
Poland	L6	PL00	
Denmark	34	DK00	
Sweden	98, EX	SE00	



The legal entities in red are out of the SCOPE of this project. Payment for these entities is done locally following a completely different process.

5. Develop a GANTT chart estimating deliverable and completion dates: For developing the GANTT chart the support form the Black Belt is critical.



Times estimations are based in past experience. The Black Belt has completed/coached several projects so his estimations are realistic. The previous Gantt chart shows all the project steps with completion dates. At the end of each phase the project is reviewed with the project Sponsor and the Black Belt. (Reviews are marked in black).

6. Identify the risk and dependencies that can impact the completion of the project: At some point in the project an IT change in the TRAMS application may be needed. Currently the IT TRAMS support team is almost fully dedicated to the development of



new reimbursement tool. **Big IT changes in TRAMS application will not be approved.** This limitation should be considered when designing the solution to the problem.

7. *Sponsoring the project:* The sponsor of the project is a person in the management team supporting the project and assigning the resources. His involvement is critical. If he shows small interest in the project the probability of completion is very small. In the case of this project the sponsor was the T&E manager. At the end of the define phase the project charter was reviewed with him and a communication review plan was agreed (see Gantt diagram).

Title: Improve accuracy of reimbursement payments Project Description



Define

PRACTICAL PROBLEM

Problem Statement: This project is related to Travel & Entertainment Reimbursement process. All HP EMEA entities with reimbursement payment via Citibank are in the scope. Currently a total of 1075 reimbursement payments per year are rejected by Citibank's automatic payment process and sent back to HP. Each of these defective payments has an associated cost of \$16 charged by Citibank + the cost of the rework. Also these defective payments lead to a mismatch between the reimbursement status displayed in the TRAMS application to the HP employee and the real reimbursement status. This mismatch results into HP employee confusion and dissatisfaction.
Project Goal: To reduce by 50% the number of rejected reimbursement payments.

External BPO customers

HP employees CTQ's:

- **Accurate reimbursement payment.**

Benefit: Reduce by 50% the average of 15 escalations/month due to rejected payments. Increase VOC score for this CTQ in the next VOC round.

- **On time reimbursement payment.**

Internal BPO customers

T&E team, Banking team CTQ's:

- **No rework as an output of the process.**

Benefits:

Savings for HP BPO of \$8600/year (currently paid to Citibank because of rejected payments).

Rework time in T&E team reduced by 90hrs/year.

Rework time in Banking team reduced by 135 hrs/year.

Out of the Scope:

All the EMEA entities not having the Reimbursement payment via Citibank.

Improve the cycle time of the rework of rejected payments. The project focus in preventing rejected payments not in simplifying the corrective activities.

BB & Project lead-Jehad Fahour&Jose Luis del Prim

Sponsor – Almudena Rebollar

Members –Jenny Lundstrom, Daniel Torres, Wasiliiki Akitidu and Rohit Ganjoo.

Stage	Deliverables	End date
Define	- Project Charter - High level process map+SIPOC	Start:1/10/2005 End:21/11/2005
Measure	- Baseline data of current performance of the process.	12/12/05
Analyze	- Data analysis Sub process mapping analysis - Identify potential X's - Prioritize X's	20/02/06
Improve	- Identify solution - Pilot Solution - Move to production (management of change) Design control mechanisms	30/03/06
Control	- Monitor solution - Quantify benefits - Put documentation in place Project Storyboard - Close Project	28/04/06

.Risks & dependencies: Big IT changes in TRAMS application will not be approved.



5. Measure Phase

5.1. Goal and outputs

The goal of the Measure step is to focus the improvement effort by gathering information about the current situation.

The outputs of the measure step include the following:

- Data that pinpoints the problem's rate of occurrence.
- Baseline data on how well the process meets customer needs (current process sigma).

5.2. Why measuring?

If you are not able to express a phenomenon in numbers, you do not know about it adequately. (Lord Kelvin)

One of the reasons for measuring is to be able to quantify the benefit of our improvement at the end of the project. Process performance data before the improvement has to be compared with process performance data after the improvement.

Conclusions based on facts and data are necessary for any improvement (K. Ishikawa)

Other important reason for measuring is to have baseline data for analysis.

Decisions have to be based in the analysis of data not in assumptions. Data will enable us to identify areas where improvements can be made.

5.3. What to measure?

From the define step we know the CTQs that are going to be improved:

M	Measure
E	Everything
T	That
R	Results
I	In
C	Customer
S	Satisfaction

CTQs

Internal BPO customers CTQ's:

No rework as an output of the process (\$ savings)

External customers CTQ's:

Accurate reimbursement payment and On time reimbursement payment



By establishing as our **project Y the % of rejected payments** we can quantify the improvement for all the CTQs.

For the CTQ “No rework as an output of the process (\$ savings)” we can easily link the project Y improvement with the CTQ improvement:

- Quantifying the \$ savings: **(Y before project-Y after project)** * annual number of transactions * \$16 per unit paid to Citibank
- Quantify the time saved in operations: **(Y before project-Y after project)** * annual number of transactions * (10 min of rework in T&E team + 15 min of rework in Banking team)

Note: The rework time assigned to the reprocessing of a rejected payment (10min+15min) was estimated by the HP BPO industrial engineering team when running an Activity Based Costing (ABC) study for these processes.

For the CTQ “Accurate reimbursement payment” and “On time reimbursement payment” we link the project Y improvement with the CTQ improvement by the following equation: Number of customer complaints in a month due to rejected payments= K*number of rejected payments in a month = $K*Y*Number\ of\ transactions\ in\ a\ month$.

Note: We assume linearity between the number of customer complaints due to rejected payments and the number of rejected payments, a reasonable assumption.

We have two types of customer complaints originated by rejected payments. The first one is when the customer complaints about the mismatch between the reimbursement payment status in the TRAMS application and the real reimbursement status. Eg: TRAMS status is paid and the money is not in the account!! The second is when the customer complaints about the delay in the reimbursement. Eg: I've reported my expenses more than one week ago and I still don't have the money in my account”.



5.4. How to measure?

In order to measure we developed the following data collection plan:

Type of data: discrete data.

Sample strategy: none.

Measurement period: 3 months period from fiscal week 37 (5th September) to fiscal week 48 (21st November).

Data source: Payment confirmation faxes send by Citibank. These documents are physically archived, so there was no need to collect data. Data was already available in hard copies for the last two years.

Data collection procedure: Retrieve form the archive all the Payment confirmation fax sent by Citibank between the 5th of September and the 25th of November. Consolidate in one single file the following information:

Operational definitions:		Data source
Opportunity definition	All reimbursements released for payment.	Payment confirmation fax send by citibank
Defect definition	All reimbursement payments rejected by citibank automatic payment process.	Payment confirmation fax send by citibank
Defect information to be collected:		Data source
Employee name:		Payment confirmation fax send by citibank
Legal entity:		Payment confirmation fax send by citibank
Citibank reason for rejection:		Payment confirmation fax send by citibank

The file with all the consolidated data is attached in A. Measure annex.



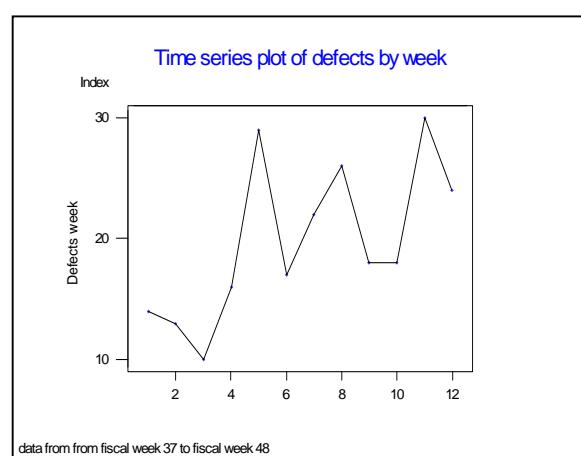
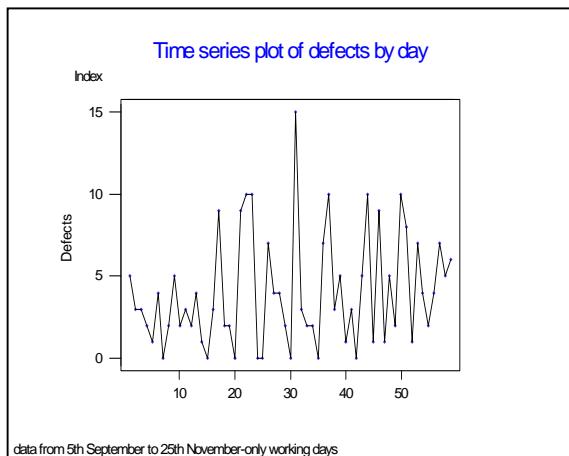
5.5. Measurement results-Current process performance

Central tendency:

- Median of rejected payments by day= **3 defects**
- Mean of rejected payments by day= **4.017 defects**
- Median of rejected payments by week= **18 defects**
- Mean of rejected payments by week= **19.75 defects**

Process variation:

In the following Time series plots we can see the evolution of total defects by day and week:



Span (P95-P5) by day:

Count	0.05	Med	0.95	Span
462	0	3	10	10

Span (P95-P5) by week:

Count	0.05	Med	0.95	Span
462	11.65	18	29.45	17.8

Process versus customer needs (Process sigma calculation):

Process	Employee Reimbursement								Sigma	
	Month	Defects		Opt	Total Opt	DPU	DPO	DPMO	Shift	
		D	U		TOP					
Rejected payments-Sept		53	1	13844	13844	53.0000	0.003828	3828	1.5	2.67 4.17
Payment Accuracy- Oct		94	1	29166	29166	94.0000	0.003223	3223	1.5	2.72 4.22
Payment Accuracy- Nov		110	1	29287	29287	110.0000	0.003756	3756	1.5	2.67 4.17
Grand Total		257	1	72297	72297	257	0.003555	3555	1.5	2.69 4.19



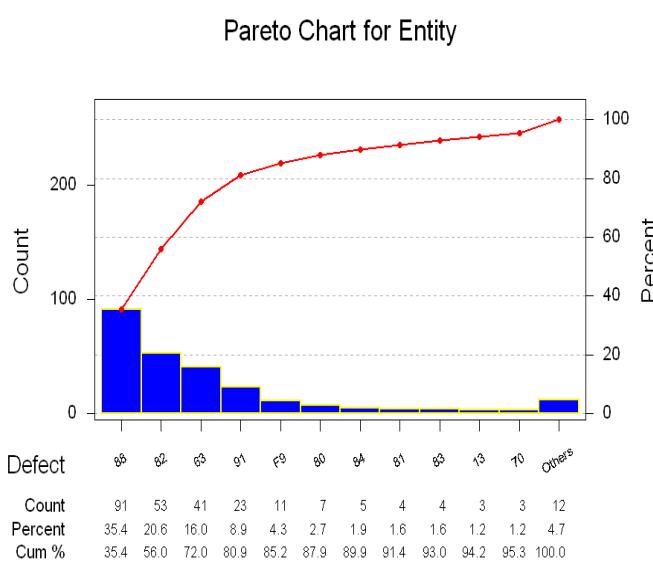
6. Analyze Phase

6.1. Goals and outputs

The goal of the Analyze step is to identify root causes and confirm them with data. The output of this step is a theory that has been confirmed with data.

6.2. Identify different segments for individual analysis

The first thing the team did was to display the defects in a Pareto by legal entity:



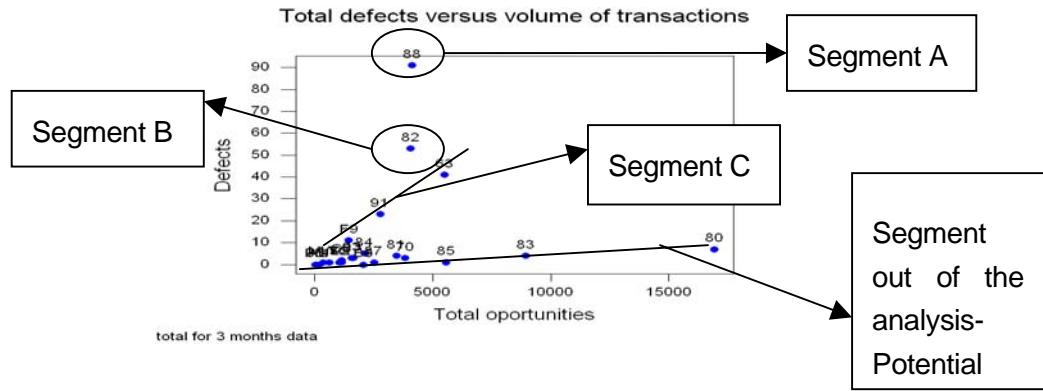
This Pareto Chart shows that 5 legal entities out of 24 in the scope (20%) where accumulating 85% of the defects. At this point the team decided to analyze the defects only for entities 88 (Sweden), 82 (Italy), 63 (France), 91 (Finland) and F9 (Spain). Also the team agreed to come back to the rest of entities in the improvement phase and leverage the improvement actions to all applicable entities.

By looking into the individual performance of the entities analyzed (individual process sigma) the team identified three different segments of performance:

Process		Employee Reimbursement										
PROCESS SIGMA FOR 3 MONTHS DATA		Defects	Unit	Opt	Total Opt	DPU	DPO	DPMO	Shift	Long Term Capabilit	Sigma	
LEGEAL ENTITY		D	U	OP	TOP	DPU	DPO	DPMO	Shift	Sigma-L	Z.B	
88		91	1	4120	4120.2	91.0000	0.022086	22086	1.5	2.01	3.51	
82		53	1	4054	4053.6	53.0000	0.013075	13075	1.5	2.22	3.72	
91		23	1	2774	2773.8	23.0000	0.008292	8292	1.5	2.40	3.90	
F9		11	1	1454	1454.4	11.0000	0.007563	7563	1.5	2.43	3.93	
63		41	1	5506	5506.2	41.0000	0.007446	7446	1.5	2.44	3.94	



Also a scatter plot helped the team to visualize these different levels of performance:



The team did an individual analysis for segments A, B and C and then extended the findings to the rest of the entities.

6.3. Analysis for segment A- Entity 88, Sweden

6.3.1. Reasons for rejection given by Citibank

The starting point for analysis in Segment A was the “error code” data given by Citibank in the daily confirmation form and collected during the measurement phase. According to Citibank, the reasons for rejection were:

Citibank Reason for Rejection	%
Invalid beneficiary account	51%
Invalid check digit	36%
Invalid receiving clearing id	10%
Reason not specified	2%

Note that one payment can be rejected for several of these reasons at the same time. In order to process the payments the TRAMS application generates a daily voucher with all the necessary details. TRAMS application uses the data in TRAMS Data Base to generate these Vouchers.

Several fields are used in TRAMS DB to store employee's bank details:



Clearing ID 1- this is the set of digits specifying the bank, the branch and the office. This field is updated in a daily basis with the data from GHRMS (HR database used for payroll).

Bank account 1- this is the set of digits that the bank uses as an ID for the employee's account. This field is updated in a daily basis with the data from GHRMS (HR database used for payroll).

Bank name 1- This the name of the employee's bank. This field is updated in a daily basis with the data from GHRMS (HR database used for payroll).

Clearing ID 2/Bank account 2/Bank name 2- TRAMS application gives the option of setting a different account for TRAMS payments than for payroll payments (GHRMS data). If desired the employee can set up a different account directly in the application or through the Customer Response Center.

Active bank account- This field specified the bank details that are active. Value can be 1 (same as GHRMS bank details) or 2 (different from GHRMS bank details). Depending on the value of this field the payment voucher will be generated with the data in group 1 or in group 2.

So according to Citibank's data the rejected payments were due to incorrect data in TRAMS DB.

6.3.2. Understanding standards for Swedish bank accounts

In order understand why TRAMS DB was accumulating incorrect bank details data for entity **88 the team had fist to clarify the definition of correct bank details (correct data)**. Surprisingly, this task became one of the most difficult ones in the project. **Neither the TRAMS operations team nor the Banking team knew the correct format structure for Swedish bank accounts.** There was no documentation in place in any of the BPO processes specifying how the Swedish bank account's format should be. After several investigations and interactions with different groups in and out HP the team came up with an **official document from the European committee for banking standards** explaining all the European standards for bank account numbers.

After carefully reading this document the team understood that for Sweden there are two ways of identifying a bank account:



- **Using the IBAN (International bank account number):** the format of the Swedish IBAN is composed as described in the table below:

		<i>Identifying ..</i>	<i>Length</i>	<i>Start position</i>
<i>d</i>	SE	<i>IBAN: ISO Country Code</i>	2a	1
<i>c2</i>	12	<i>IBAN: Check Digits</i>	2n	3
<i>b</i>	123	<i>Bank - Branch code</i>	3n	5
<i>a</i>	123456789012 3456	<i>Account number</i>	16n	8
<i>c1</i>	1	<i>Check digit</i>	1n	24
		<i>Total</i>	24an	

Total of 24 alpha-numeric characters.

The paper representation of the IBAN is composed of 4 characters separated by a blank.

Ex: SE12 1231 2345 6789 0123 4561

For electronic transactions no blanks are

permitted. Ex: SE1212312345678901234561

The actual automatic payment process contracted by HP for reimbursement payments does not support payments using IBAN. So all the bank details stored in TRAMS DB referring to IBAN will be incorrect data.

- **Using the domestic account number:** the format of Swedish account number is incredibly complex.
Various account structures are used not only by different banks but also sometimes within the same bank. In this table the most important existing bank struc

Bank	Account numbers in number sequence	Check modulus
Nordea	<u>1XXX XX XXXX X</u>	11
Danske Bank, Sverige, branch /Östgöta Enskilda bank ¹⁴	<u>12XX -</u> <u>13XX XX XXXX X</u>	11
Nordea	<u>14XX -</u> <u>20XX XX XXXX X</u> <u>223X XXXXXXXX X</u>	11 11 11
Kaupthing Bank Sverige	<u>23XX XX XXXX X</u>	11
Nordea	<u>30XX -</u> <u>32XX XX XXXX X</u>	11 11
Nordea	<u>3300 XXXX XXXXXX</u> <u>3782 XXXX XXXXXX</u>	10 ¹⁵
Länsförsäkringar Bank	<u>340X XXXXXXX X</u>	11
Nordea	<u>341X -</u> <u>4XXXX XX XXXX X</u>	11 11
S E B	<u>5XXXX XXXXXXX X</u> <u>6XXXX XXXXXX XXX</u>	11 11
Handelsbanken ¹⁶	<u>7XXXX XX XXXX X</u>	11
FöreningsSparbanken, Swedbank ¹⁷	<u>8XXXX XX</u> <u>Up to XXX XXXXX XXX</u>	10 ¹⁸
Länsförsäkringar Bank	<u>902X XXXXXXX X</u>	11
Citibank, branch	<u>904X XX XXXX X</u>	11
HSB Bank	<u>905X XX XXXX X</u>	11
Länsförsäkringar Bank	<u>906X XX XXXX X</u>	11
Credit Agricole Indosuez, branch	<u>908X XXXXXXX X</u>	11
ABN AMRO Bank, branch	<u>909X XX XXXX X</u>	11
ACC Bank, branch	<u>910X XX XXXX X</u>	11
S E B	<u>9120 -</u> <u>9124 XX XXXX X</u>	11 11
S E B	<u>913X -</u> <u>914X XX XXXX X</u>	11 11
Skandia Banken	<u>915X -</u> <u>916X XX XXXX X</u>	11 11
IKANO Banken	<u>917X XX XXXX X</u>	11
Danske Bank, Sverige, branch	<u>918X XXXXXXXXXXXX</u>	10
Den Norske Bank, branch	<u>919X XX XXXX X</u>	11



From this file and after a huge investigation the team created a document explaining for each of the banks in Sweden how the bank details were provided by the bank and how they should be stored in the TRAMS DB to ensure a correct automatic transaction. **This document clearly defines by bank name the definition of correct bank details (format) when storing data in the domestic account structure. This document is attached in the annex B. 1 Domestic bank account structures for Sweden.** As an example we can see below the different structures used by one of the most important banks: ForeningsSparbanken.

ForeningsSparbanken structure 1-

Bank account structure 1

Format as provided by the bank:		
Structure	Clearing number	Bank account
# of digits	4	7
Comments	If you are not sure of your clearing number, you can check it in this link.	Hyphens, spaces or other special characters sometimes occur.
Range of clearing numbers	7XXX	

Example

Clearing number	Bank account
7540	1109921

Correct format in TRAMSDB:

Bank account	1109921
Bank name	ForeningsSparbanken
Clearing ID:	7540

Should be 7 digits in TRAMS DB. 3 leading zeros (up to 10 digits) are automatically added by trams when generating the electronic transaction. No spaces or special charact. are allowed.

Should be 4 digits.

Specifications for bank details in TRAMS DB for ForeningsSparbanken structure 1:

Clearing ID: Should be 4 digits. No blanks or special characters are permitted. All accounts with a clearing ID starting with the digit 7 belong to this group so the first digit of the clearing ID is providing the bank's name.

Bank name: ForeningsSparbanken. This field is optional and is not used to generate the electronic transaction. Anyway from a reporting perspective is important

to update it in TRAMDS DB.

Bank account: Should be 7 digits. Blanks or special characters should be removed. TRAMS adds 3 leading zeros when generating the transaction increasing the number of digits of this field up to 10 digits.

ForeningsSparbanken structure 2-

Specifications for bank details in TRAMS DB for ForeningsSparbanken structure 2:

Clearing ID: Should be 4 digits. No blanks or special characters are permitted. All accounts with

Format as provided by the bank:		
Structure	Clearing number	Bank account
# of digits	5	From 2 to 10
Comments	If you are not sure of your clearing number, you can check it in this link.	Hyphens, spaces or other special characters sometimes occur.
Range of clearing numbers	8XXXX	

Example

Clearing number	8214 6
Bank account	4305021-3

Fifth digit for clearing number should not be included for electronic transactions

Correct format in TRAMSDB:

Bank account	43050219
Bank name	ForeningsSparbanken
Clearing No:	8214

Can have from 2 to 10 digits. No spaces are allowed. Leading zeros are automatically added by trams.

Should be 4 digits



a clearing ID starting with the digit 8 will belong to this group so the first digit of the clearing ID is telling us the name of the bank. For this cases the bank provides a fifth digit in the clearing ID. This fifth digit should not be appearing in TRAMS DB. Only the first four digits should be in the database.

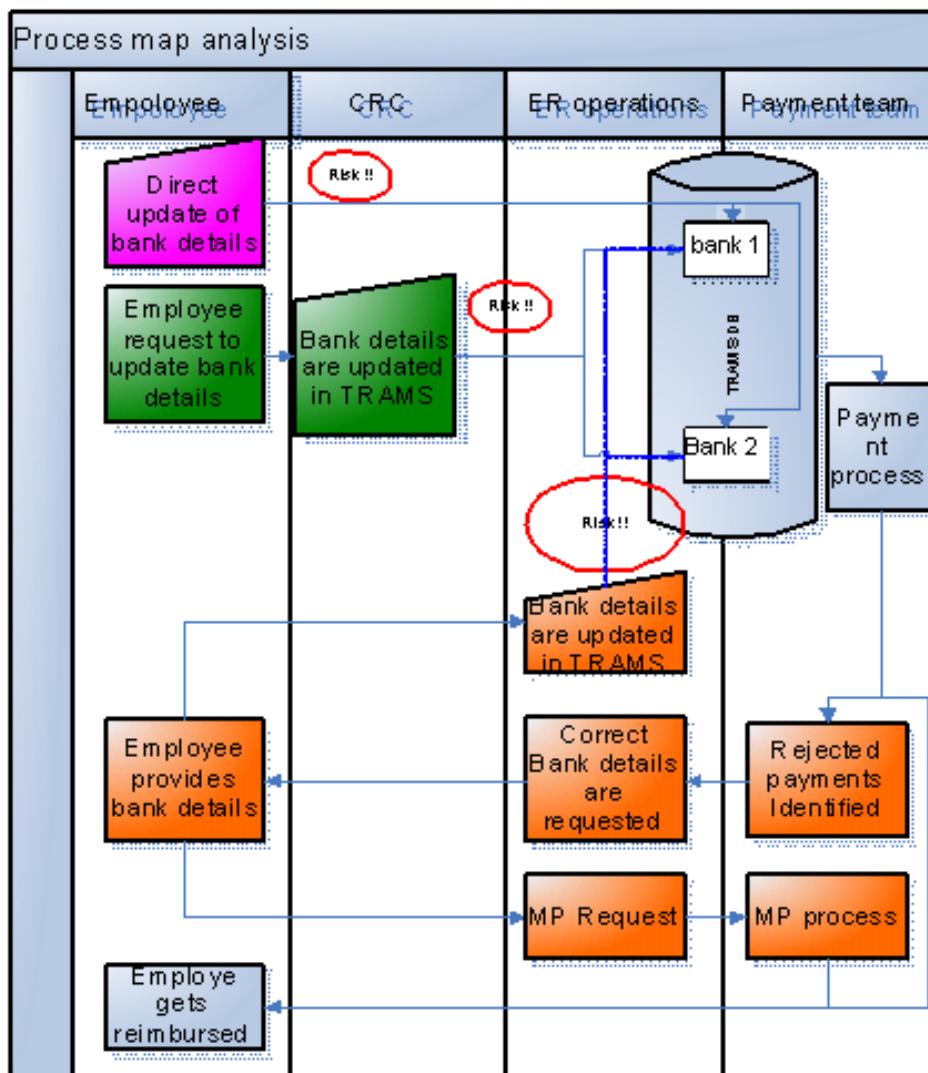
Bank name: ForeningsSparbanken. This field is optional and is not used to generate the electronic transaction. Anyway from a reporting perspective is important to update it in TRAMDS DB.

Bank account: Any number of digits from 2 to 10 digits. Blanks or special characters should be removed. TRAMS adds leading zeros up to 10 digits when generating the transaction.

6.3.3. Identifying potential root causes

At this point of the analysis, the team knew that the bank details data for some Swedish employees was not stored properly in TRAMS DB but, in the other hand, now the team knew how these bank details should be stored.

The next step was to identify all the origin data sources that were updating TRAMS DB. At this level we used a sub process mapping technique. In the following chart we can see all the different data flows updating the TRAMS DB:

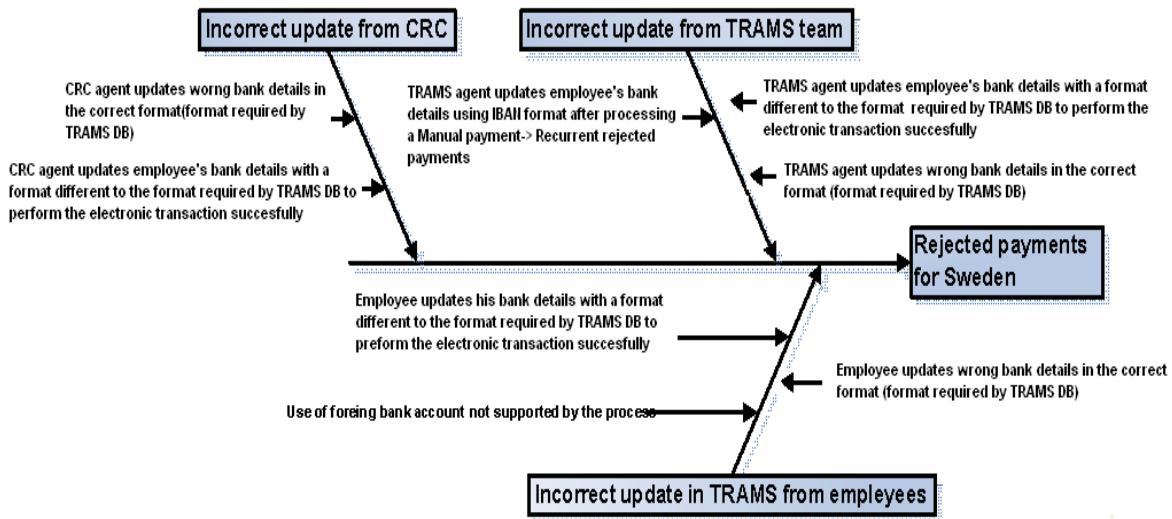


The findings from the sub process mapping were extremely surprising:

1. **There was no automatic bank details update from GHRMS (HR database).**
Before this project bank details for all legal entities were supposed to be updated in a daily basis from GRMS (HR database). After investigation with the Swedish HR local department the team found out that the HR database for Sweden contains no information related to bank details. **Payroll in Sweden is not done from the GHRMS but from separate Payroll system. Employee details like name, employee id... were updated in a daily basis into TRAMS DB from GHRMS but as there were no bank details in GHRMS, no automatic update was done for bank details.** Also there was no flow of information between the local Swedish payroll system and TRAMS DB.
2. **Employees could manually update data in both “bank details 1” fields and “bank details 2” fields.** This information flow is highlighted in the process map in pink. **No validation check was done by the application when entering the bank details. No explanation was given to the employee in how to update the bank details.**
3. **CRC agents could manually update data in both “bank details 1” fields and “bank details 2” fields.** This information flow is highlighted in green. When requested via the Customer Response Center the CRC team was updating the employee bank in “bank details 1” fields or in “bank details 2” fields depending on the agent processing the update. As mentioned earlier there was **no existing documentation or team knowledge in how to correctly update in TRAMS DB the bank details for Sweden. Bank details were entered as stated by the employee.**
4. **TRAMS agents could manually update data in both “bank details 1” fields and “bank details 2” fields.** This information flow is highlighted in orange. When a rejected payment occurred TRAMS team requested the IBAN to the employee and send it to the payment team in India to process a manual payment. IBAN was requested instead of domestic bank details because for the payment team Manual payments with IBAN were easier to process than manual payments with domestic account structure. **The Trams team updated TRAMS DB with the IBAN.**

After completing the sub process mapping exercise for the flow of information updating TRAMS DB, the team developed a fishbone diagram listing all the potential root causes for rejected payments in Entity 88:





The potential root causes for rejected payments for Sweden were grouped in three categories:

Risk area 1-Employee: Potentially three actions in this area would lead to a rejected payment. The first one was when the employee updated his bank details with a format different to the format required by TRAMS DB. This is something that could easily happen. As the team discovered in his investigation, bank details are provided to the employees by their banks in a format different to the format required by TRAMS DB. As long as the employee was not aware of this issue he would update his bank details as provided by the bank, leading to a rejected payment. The second action was when the employee, being aware of the format required by TRAMS DB, entered incorrect data in the correct format Ex: typo error. These cases will also lead to a rejected payment (invalid check digit). Finally, the third action was when the employee used a foreign account. The automatic payment process does not support international transactions. Employees from entity 88 must be reimbursed in a Swedish account. Otherwise the payment will be rejected.

Risk area 2-CRC: Potentially two situations in this area would lead to a rejected payment. The first one was when the CRC agent updated the employee's bank details with a format different to the format required by TRAMS DB. This is something that can easily happen. The employee could submit his request providing his bank details as provided to him by the bank. The CRC agent, lacking the knowledge of updating Swedish bank detail in the correct format, would update the bank details as given in the request, leading to a rejected payment. The second situation was when the employee or the CRC agent entered an

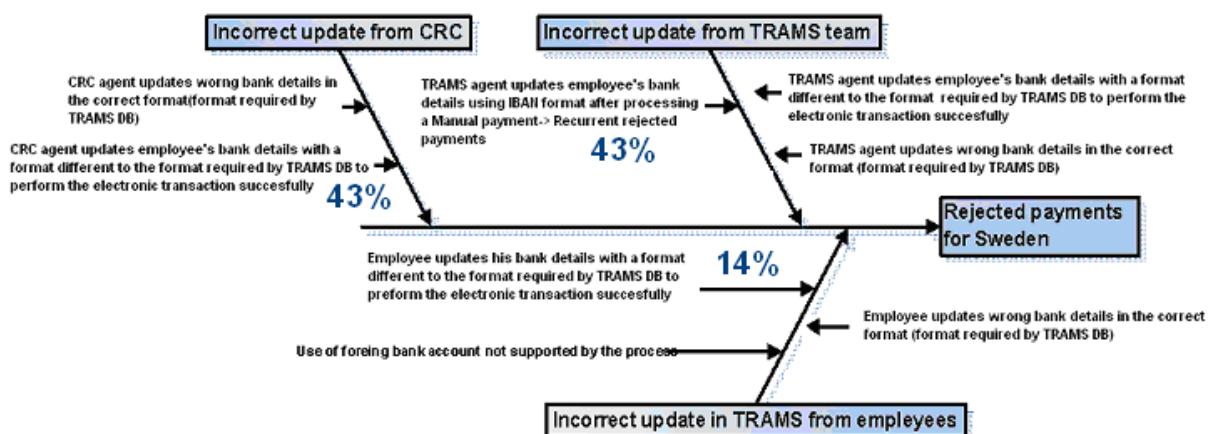


incorrect digit when typing the data, even if the format used was correct. These cases would also lead to a rejected payment (invalid check digit).

Risk area 3-TRAMS team: Potentially three situations in this area would lead to a rejected payment. The first two were identical to the potential situations in the CRC risk area. The third situation was when after processing some manual payments the TRAMS team updated the TRAMS DB with the employee's IBAN. Even if IBAN can be used for manual payments processing simplifying the complexity of this process, the automatic payment process does not support this format of bank details. So this action would lead to recurrent rejected payments each time the employee submits a travel expense claim.

6.3.4. Narrow to the root causes

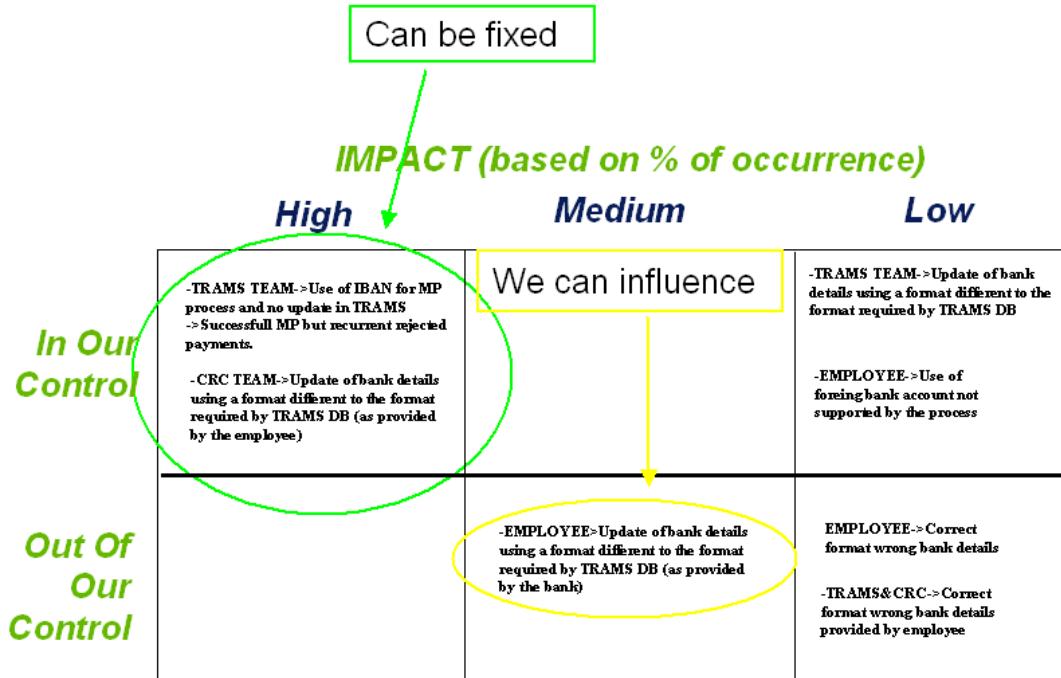
The next step in the analysis was to confirm our fishbone with data. The goal was to quantify the contribution of each of the potential root causes to the total number of rejected payments for entity 88.



The team couldn't use the data gathered in the measurement phase to do this quantification. TRAMS system keeps records only of the last person who did the bank details update. So it was not possible to know for past rejected payments who did the information update. The team decided then to collect 2 weeks data. In a daily basis, after receiving the rejected payment list from Citibank, the team collected data of who did the last bank details update for that employee (origin of root cause) and how this update was done (root cause). The results are included in the fishbone presented in the previous page.



The output of our analysis is presented with the following priority matrix:



6.4. Analysis for segment B- Entity 82, Italy

6.4.1. Reasons for rejection given by Citibank

The starting point for analysis in Segment B was the error code data given by Citibank and collected during the measurement phase. According to Citibank, the reasons for rejection were:



Citibank Reason for Rejection	%
Invalid beneficiary account	38%
Invalid receiving clearing id	25%
Beneficiary address invalid	23%
Beneficiary post code invalid	13%
Invalid check digit	1%

As in the analysis for previous segment payments were due to incorrect data in TRAMS DB. But this time Citibank was not only referring to bank details data but also to employee's address and post code data.

6.4.2. Understanding standards for Italian bank accounts

As in analysis of segment A the official document from the European committee for banking standards was used.

After carefully reading this document the team understood that for Italy there are two ways of identifying a bank account:

- **Using the IBAN (International bank account number).**
- **Using the domestic account number.**

Applying the findings of analysis of segment A, all the bank details stored in TRAMS DB referring to IBAN will be incorrect data and will not be supported by the automatic payment process. So there was no interest in understanding Italian IBAN structure.

The domestic account structure for Italy was much more simple than the Swedish one. There is a single standard format:

		Identifying	Min/max	Fills	Example
c	1	Check digit	1/1	a	
b1	12345	Bank code	5/5	n	
b2	12345	Branch code	5/5	n	
a	123456789012	Account number	12/12	an	
		Total	23/23	an	

Coordinata Bancaria			
c	1	CIN (Control Internal Number)	
b1	12345	ABI code	
b2	12345	CAB code	
a	123456789012	Numero di Conto	

Remark that Italian banks provide the bank details data as described in the right hand table.



As for Sweden, the team created for Italy a document explaining how the bank details were provided by the bank and how they should be stored in the TRAMS DB to ensure a correct automatic transaction:

Format as provided by the bank				
Coordinata bancaria	CIN(Control Internal Number)	ABI code	CAB code	Numero di conto
# of digits	1	5	5	12
Comments	Alphabetic	Numeric	Numeric	Alphabetic/numeric

Example

Comments	CIN(Control Internal Number)	ABI code	CAB code	Numero di conto
X	05428	01101		000000123456

Starting zeros should be included

No separators or special characters

Correct format in TRAMS DB

TRAMS	Bank account	000000123456	12 digits
	Bank name	ING Direc N.V.	
	Clearing No:	0542801101	10 digits

Specifications for bank details in TRAMS DB for Italian bank accounts:

Clearing ID: Should be 10 digits.

No blanks or special characters are permitted. Clearing ID is composed of ABI code+ CAB code

Bank name: This field is optional and is not used to generate the electronic transaction. Anyway from a reporting perspective is important to update it in TRAMDS DB.

Bank account: Should be 12 digits. Blanks or special characters should be removed. TRAMS when generating the transaction do not add leading zeros.

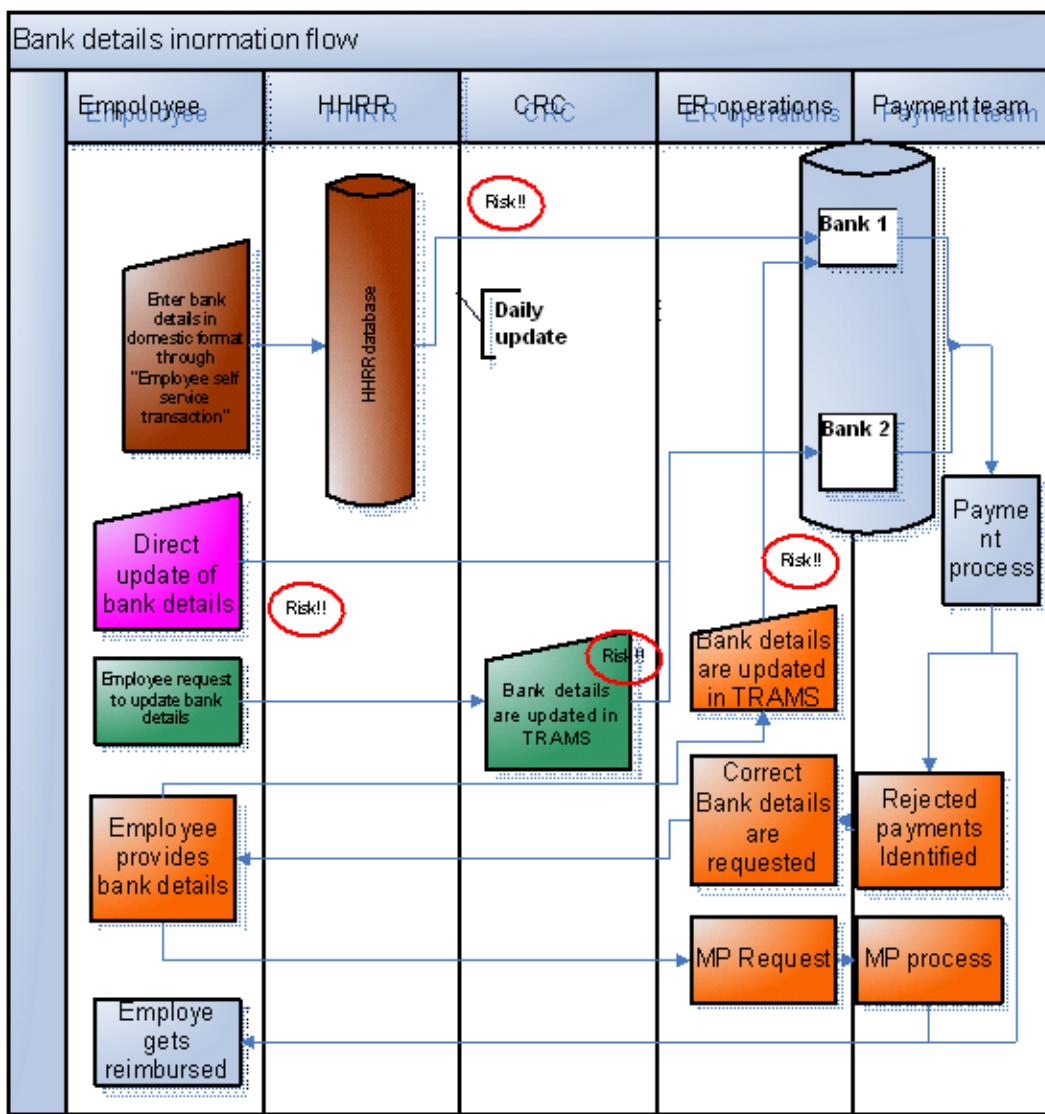
Automatic payments via Citibank for Italy require the name of the employee's city (should be an Italian City) and a valid zip code within that city (5 digits zip code).

6.4.3. Identifying potential root causes

Once all the specifications for automatic payments were known the team proceeded as in the analysis of Segment A by doing a sub process mapping analysis.

In the following chart we can see all the different data flows updating the TRAMS DB for entity 82:





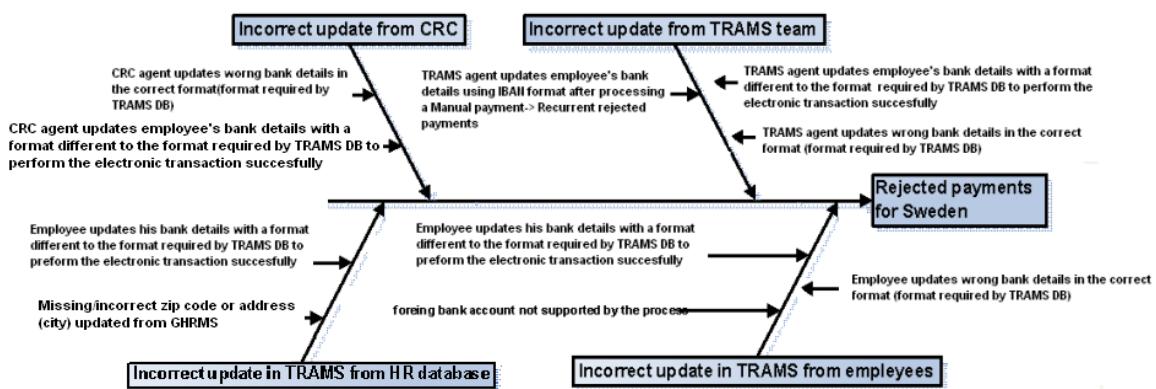
The findings from the sub process mapping were the following:

- As expected there was an automatic update from GHRMS (HR database). After investigations the team discovered that the update was done in a daily basis. All the details from the employee like name, employee id, zip code, address, bank details were automatically populated in trams from GHRMS. Also GHRMS was manually populated and maintained by the employee by entering his details via the HP portal “self service transaction”. No validation checks were done in this portal when entering the bank details. Address, city and zip code were not mandatory fields in this portal. This information flow is highlighted in brown.



2. **Employees could manually update bank details 1 fields and bank details 2 fields.** This information flow is highlighted in the process map in pink. **No validation checks were done by the application when entering the bank details. No explanation was given to the employee in how to update the bank details.**
3. **CRC agents could manually update bank details 1 fields and bank details 2 fields.** This information flow is highlighted in green. **No existing documentation in how to correctly update the bank details in TRAMS DB for Italy was in place. Bank details were entered as stated in the employee in his request.**
4. **Trams team agents could manually update bank details 1 fields and bank details 2 fields.** This information flow is highlighted in orange. When a rejected payment occurred TRAMS team requested the IBAN to the employee and send it to the payment team in India to process a manual payment. IBAN was requested because Manual payments with IBAN were easier to process than manual payments with domestic account structure. **In most of the cases the Trams team updated TRAMS DB with the IBAN.**

After completing the sub process mapping exercise for the flow of information updating TRAMS DB, the team was able to develop a fishbone diagram listing all the potential root causes for rejected payments in Entity 82:



The potential root causes for rejected payments for Italy were grouped in four different categories:



Risk area 1-Coming from the employee: Idem as for Sweden.

Risk area 2-Coming from CRC: Idem as for Sweden.

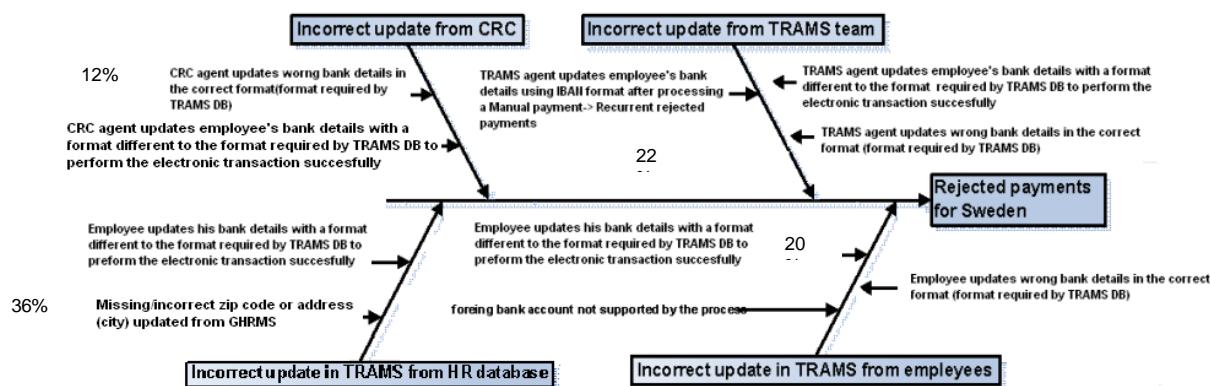
Risk area 3-Coming from TRAMS team: Idem as for Sweden.

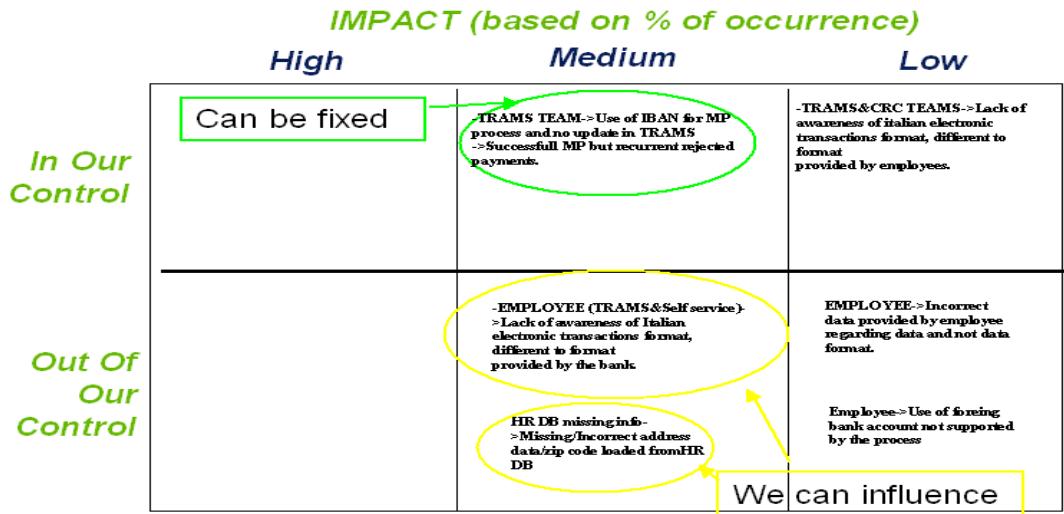
Risk area 4-HR database: In a daily basis GHRMS updates TRAMS DB. If incorrect bank details or incorrect address (city) or Zip code in GHRMS the incorrect data will be transferred to TRAMS DB. For entity 82 GHRMS database is populated and maintained by the employee through the HP portal “Self service transaction”. Remark that every month a monthly electronic payment is done to all the employees from GHRMS for payroll. This fact should help to keep GHRMS updated with correct and complete data.

Also remark that even if Entity 82 and 88 have the same root causes for Risk areas 1,2 and 3 the probability of occurrence of these root causes in entity 88 is much higher as the complexity of the bank details for Sweden is much higher than the complexity for the bank details for Italy.

6.4.4. Narrow to the root causes

In order to quantify the real contribution to the rejected payments in Italy of each potential root cause the team proceeded as for entity 88. The results where the following:





So the output of our analysis for rejected payments in entity 82 will be a list of root causes organized in a the following priority matrix.

6.5. Analysis for segment C- Entities 91(Finland), F9 (Spain) and 63 (France)

The team followed the same steps for the analysis of segment C as for the previous segments. **The process map of the data flows updating TRAMS DB was, for these entities, exactly the same as for entity 82.** The only difference between entity 82 and the entities in segment C was that for electronic payments in the countries of the entities in segment C the Zip code and address was not necessary. So for entities in segment C, no rejected payments will occur if the employee is not updating his address and zip code in the HP Portal “Self service transaction”. After analyzing segment C the team concluded that all actions taken in the improvement phase to eliminate root causes for rejected payments in entity 82 (excluding the ones addressing the issue with missing employee's address and zip code) would be applicable for entities in Segment C. Domestic account structures for Finland, Spain and France are attached in B.2 Domestic bank account structures for segment C.



7. Improve Phase

7.1. Goals and outputs

The goal of the improve step is to develop, try out, and implement solutions that address root causes and to use data to evaluate the solutions as well as the plans you use to carry them out.

The outputs of the Improve step include the following:

- Planned, tested actions that eliminate or reduce the impact of the identified root cause(s) of a problem.
- “Before” and “after” data analysis that shows how much the initial gap was closed.

The actions taken in the improvement step of this project are divided in two groups depending on their nature:

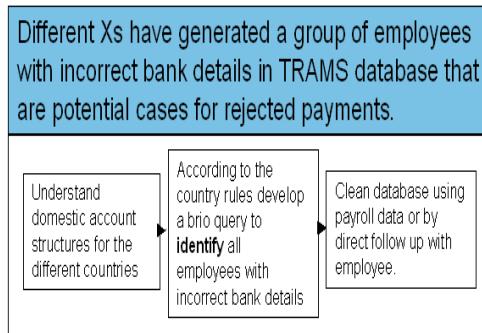
- Corrective actions: During the analysis step the team learned that the different Xs (root causes) had generated a relevant amount of incorrect employee's bank details in TRAMS DB. This incorrect data would lead to a rejected payment in case the related employee requested a reimbursement. All the actions taken to clean up all the accumulated incorrect bank details in TRAMS DB were categorized as corrective actions.
- Preventive actions: All the actions taken to eliminate the different Xs (root causes). These actions prevent the accumulation of incorrect bank details in TRAMS DB and therefore potential rejected payments.

7.2. Implementation of Corrective actions

The team decided to apply the corrective actions (database clean up) to all the entities.

Corrective actions are presented in the following chart:





- For entities 88, 82, F9, 91 and 63 the domestic bank account structure was understood and documented in the analysis step. At this point the team did the same exercise for the rest of entities. All the documentation created is attached in the annex C.1 Domestic account structures

for rest of entites.

- Once all the domestic accounts structures were understood the team developed, according, to the country rules a query (Brio Query) to identify all the employees with incorrect bank details format in TRAMS DB. The code of the query by country is attached in the annex C.2 Code for brio Query. In the following table the a

Emp Nr	Emp Lst Nm	Emp Fst Nm	Active bank name	é clean num	len qth	Active bank account	len qth 2	Gene ral criteri as	Type 1	Type 2	Type 3	Type 4	Type 5	No type
00662234	Johansson	Anders			0		0	X						X
00661803	Boklund	Jan-Erik			0		0	X						X
00662221	Olszro	Goran	FöreningsSpa	IBAN	9	SE99800000083275	24	X						X
20070068	Blumenthal	Ulrika			0		0	X						X
00661605	Johansson	Niklas			0		0	X						X
00662256	Ljung	Peter			0		0	X						X
00661845	Strommer	Olof	FöreningsSpa	8420-	6	1041505221	10	X						
00661489	Hockenst	Jan	Handelsbank	6921	4	1160339352272	13	X						
00661927	Westerstr	Ulf	SEB	5411	4	8411.00.337.64	14	X						
00661270	Lundberg	Fredrik	Swedbank	83279	5	83279.2353485109	15	X						
00662522	Jonsson	Anders	FöreningsSpa	83279	5	36082964	6	X						
00662512	Eldin	Marie	FöreningsSpa	81059	5	745236703	9	X						
00501634	Ekman	Carl-Jör	Sparbanken C	9330	4	593.041.483-3	13	X						
00661653	Tornqvist	Kristian	FöreningsSpa	8000	4	8214943090809	13	X						
00661588	Von Wald	Helene	Svenska Hand	600	3	000000003147423	16	X						
20069267	Laakso	Kristian	Svenska Hand	1160	4	6011129210552	13	X						
08107707	van Kerkw	William	DEUTSCHE	70070	8	6529259	7	X						
00661867	Peterson	Jonas	FöreningsSpa	83279	5	235786927	9	X						
20135913	Rennman	Henrik	Sparbanken F	9300	4	93000048996219	14	X						
00662279	Kanvik	Magnus	Nordea	3000	4	7012030582	10	X						
00661549	Oleeson	Lars		3257	4	93173	5	X						
20073545	Reibowski	Anna	Nordea	1830	4	7803050727	10	X						
20065587	Gammeljor	Lise-Lott	Lansforskrift	9020	4	90201216436	11	X						
00661793	Andersson	Roy	SEB	5407	4	97007	5	X						
00662388	Glimdal	Ive		3059	4	101870	6	X						
00661384	Engström	Matz		4039	4	41817	5	X						
20070078	Foqeb	Jesper	nordea	3000	4	7105170034	10	X						
07743765	Friak	Veronica	SEB	5398	4	0000013169	10	X						
20135865	Hedberg	Annika	SEB	5267	4	62670079652	11	X						
20118440	Stenqvist	Karolina	Skandibanke	9150	4	91503227415	11	X						
00662171	Lindelof	Jonas		5367	4	108068	6	X						
20124524	Silfverber	Magnus	SEB	5209	4	52090214902	11	X						

snapshot of the query designed for Sweden is presented. In the case of countries with several domestic account structures the bank code number was used to identify the applicable domestic account structure. Note the complexity of the query for Sweden due to the different account structures existing in the country. The total number of employee's detected by the query added up to 370 lines (156 of them where Swedish employees).

- Once all the employees with incorrect bank details were detected resources were allocated to clean up the database. Direct follow up with employees was necessary in a lot of cases. The clean up took one week with 3 full time resources.



7.3. Implementation of preventive actions

7.3.1. Preventive actions-Particular solution for Segment A, Sweden

Potential solutions not implemented

Before arriving to the final solution, the team considered two actions to eliminate the Xs in Sweden. Due to IT limitations these actions were not implemented.

The first request was **to link the TRAMS DB to the actual Payroll system**. As described in the analysis phase, TRAMS DB is linked to HR database but for Sweden HR database doesn't contain bank details information. All the bank details are maintained in a separate payroll database. The reason for rejecting this IT change request was the limitation of IT TRAMS resources due to the implementation of the new Employee reimbursement application. This change requested supposed a big implementation effort from the IT TRAMS team that currently was fully dedicated to the development of the new Employee reimbursement application. Even though the change was rejected for TRAMS the IT team included the request as a requirement for the new tool. Remark that the "go live" of this new tool is planned for end 2007.

The second request was **to incorporate to TRAMS the possibility to generate electronic transactions using IBAN**. IBAN format for Sweden is standard. This fact would simplify the complexity of the Swedish bank details diminishing the actual number of rejected payments. The reason for rejecting this change request was the same as for the first change request: availability of resources. Even though the change was rejected for TRAMS the IT team included the request as a requirement for the new tool.

Implemented solutions

The actions taken to reduce/eliminate the Xs generating the rejected payments in Sweden were:

- Implementation of a weekly report capturing all the employees with bank details not meeting the requirements. This report is exactly the same report as the one used for cleaning up TRAMS DB. The Team leader should run it in a weekly basis. Employees in the report should receive a notification mail with a document explaining how to



correctly update bank details in TRAMS. This procedure was included in the ISO material as a weekly activity. Trams team is responsible of updating the report with changes in the Swedish accounts structures.

- Creating Knowledge in the Teams-The documentation created in the analysis phase specifying the correct format of bank details for Sweden in TRAMS DB was added to the ISO documentation of the CRC and TRAMS team. This documentation is critical for CRC to answer the queries related to bank details. Also work instructions for TRAMS team were modified highlighting the importance of updating the domestic account structure in TRAMS after a manual payment avoiding recurrent manual payments.

In the following table all the actions taken are assigned to their related X:



Origin of Xs	Xs	Preventive actions
Employee	Employee updates his bank details in TRAMS with a format different to the format required by TRAMS DB to perform electronic transactions successfully	Manual report (Brio query) to detect all the employees with bank details not meeting the requirements- Potential rejected payments.
	Employee uses a foreign bank account in TRAMS (bank account form a country different to the country of his legal entity)	Template to explain employees in the report how to correctly update bank details in TRAMS
	Employee updates incorrect bank details with the correct format	No action was taken
Customer Response Center	CRC agent updates employee's bank details in TRAMS with a format different to the format required by TRAMS DB to perform electronic transactions successfully	Creating knowledge-Documentation was created (templates) explaining the complex domestic account structure for Sweden. This documentation was included in the work instructions of ISO material. Team was trained in this material.
	CRC agent updates employee's incorrect bank details with the correct format	No action was taken
TRAMS operations team	TRAMS agent updates employee's bank details in TRAMS using IBAN format after processing a manual payment->Recurrent manual payment	Documentation was created (templates) explaining the complex domestic account structure for Sweden. Templates were designed to request bank details to employees for processing manual payments. Procedure for processing manual Payments in ISO material was updated highlighting the importance of not using IBAN structure for manual payments. Team was trained on this material.
	TRAMS agent updates employee's bank details in TRAMS with a format different to the format required by TRAMS DB to perform electronic transactions successfully	Documentation was created (templates) explaining the complex domestic account structure for Sweden. This documentation was included in the work instructions of ISO material. Team was trained in this material
	TRAMS agent updates employee's incorrect bank details with the correct format	No action was taken



7.3.2. Preventive actions-Standard solution (Segment B+ Segment C)

As discussed in the analysis step, all actions taken in the improvement phase to eliminate root causes for rejected payments in entity 82 (excluding the ones addressing the issue with missing employee's address and zip code) would be applicable for entities in Segment C. Actions taken can be grouped in three categories:

1. Format validation checks in TRAMS:

Before this project all type of characters could be entered in the account number and clearing ID fields in TRAMS. Eg: blanks, -, /.... Also there was no minimum or maximum number of digits allowed for the account number and clearing ID fields in TRAMS. The team, based on the specification formats documented in the analysis phase, requested the following IT changes in TRAMS:

Entity 82 (Italy):

Changes requested for the updating bank details screen:

- Bank 1/Clearing ID 1: Block manual updating of these fields.
- Clearing ID 2: Check that the update contains 10 digits and that the update contains only numerical values.
- Bank 2: Check that the update contains 12 digits and that the update contains only numerical values.

Entity F9 (Spain):

Changes requested for the updating bank details screen:

- Bank 1/Clearing ID 1: Block manual updating of these fields.
- Clearing ID 2: Check that the update contains 8 digits and that the update contains only numerical values.
- Bank 2: Check that the update contains 12 digits and that the update contains only numerical values.

Entity 91 (Finland):

Changes requested for the updating bank details screen:

- Bank 1/Clearing ID 1: Block manual updating of these fields.
- Clearing ID 2: Check that the update contains 6 digits and that the update contains only numerical values.
- Bank 2: Check that the update contains 8 digits and that the update contains only numerical values.



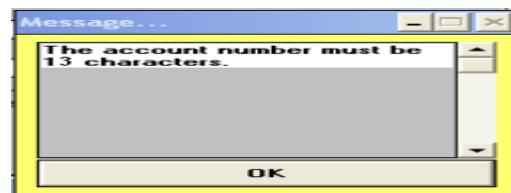
Entity 63 (France):

Changes requested for the updating bank details screen:

- Bank 1/Clearing ID 1: Block manual updating of these fields.
- Clearing ID 2: Check that the update contains 10 digits and that the update contains only numerical values.
- Bank 2: Check that the update contains 13 digits and that the update contains only numerical values.

These validation checks are applicable to updates done by employees, CRC agents and TRAMS agents. In the following screen shoot we can see the error message that will result if bank details are not entered according to the specifications:

Employee Information (cont'd)	
Payment Information (cont'd)	
Other Bank 1	
Bank Account:	33333333
Bank Name:	CE Grenoble



2. Validation check in HP portal "Self service transaction menu":

Same checks as in TRAMS were requested to the HP portal IT team. Also an extra request was submitted.

Additional request for entity 82:

Employee address in Italy (name of the city) and zip code should be a mandatory field.

Zip code should be 5 numerical digits.

3. Creating documentation (templates)+ training to teams:

The documentation created in the analysis phase specifying the correct format of bank details in TRAMS DB was added to the ISO documentation of the CRC and TRAMS team. This documentation was especially critical for CRC to answer the queries related to bank details. Also work instructions for TRAMS team were modified highlighting the importance of updating the domestic account structure in TRAMS after a manual payment avoiding recurrent manual payments. Templates explaining specifications of bank details were designed in a manner that the TRAMS team could use them to request to employee's their bank details after a rejected payment. By using this templates for requesting bank details the TRAMS team will not only get the bank details in the correct format but also will train the employee in the correct format of bank details for electronic transactions.



In the following table all the actions taken are assigned to their related X:

Origin of Xs		Preventive actions	
		Segment B	Segment C
Employee	Employee updates his bank details in TRAMS with a format different to the format required by TRAMS DB to perform electronic transactions successfully	Automatic format validation check was added in TRAMS to ensure that bank details updates are done correctly.	
	Employee uses a foreign bank account in TRAMS (bank account from a country different to the country of his legal entity)		
	Employee updates incorrect bank details with the correct format		No action was taken
HR database (employee)	Employee updates his bank details in the HP portal "Self service transaction" with a format different to the format required by TRAMS DB to perform electronic transactions successfully	Automatic format validation check was added in the HP portal to ensure that bank details updates are done correctly.	
	Employee doesn't update his address and zip code in the HP portal "Self service transaction"		Zip code and address were set up as mandatory fields in the HP portal "Self service transaction". Automatic format validation check was added for zip code in the HP portal "Self service transaction"
Customer Response Center	CRC agent updates employee's bank details in TRAMS with a format different to the format required by TRAMS DB to perform electronic transactions successfully	Automatic format validation check was added in TRAMS to ensure that bank details updates are done correctly. Documentation was created (templates) explaining the domestic account structure for each country. This documentation was included in the work instructions of ISO material. Team was trained on this material.	
	CRC agent updates employee's incorrect bank details with the correct format		No action was taken
TRAMS operations team	TRAMS agent updates employee's bank details in TRAMS using IBAN format after processing a manual payment->Recurrent manual payment	Automatic format validation check was added in TRAMS to ensure that bank details updates are done correctly. Documentation was created (templates) explaining the domestic account structure for each country. Templates were designed to request bank details to employees for processing manual payments. Procedure for processing manual in ISO material was updated highlighting the importance of not using IBAN structure for manual payments processing. Team was trained on this material.	
	TRAMS agent updates employee's bank details in TRAMS with a format different to the format required by TRAMS DB to perform electronic transactions successfully		Automatic format validation check was added in TRAMS to ensure that bank details updates are done correctly. Documentation was created (templates) explaining the domestic account structure for each country. This documentation was included in the work instructions of ISO material.



7.3.3. Preventive actions-Leverage of the general solution to the rest of entities

Most of the solutions implemented for Segments B and C were also implemented for the entities where the solution was applicable:

- Validation checks in TRAMS:
Implemented for entities in Belgium, Germany, Portugal, Switzerland, Denmark, Ireland, Norway and UK. Validation checks were done according to specifications attached previously documented.
- Validation checks in the HP portal:
Not applicable for any of the remaining entities. Only Entities 82, F9, 63 and 91 were using the HP portal “Self service transaction” to update the HR database. For the rest of the entities the HR local team did the update of HR database. Knowledge on how to update the bank details correctly existed in the team so no action was necessary.
- Documentation (templates)+training

Implemented for entities in Belgium, Germany, Portugal, Switzerland, Denmark, Ireland, Norway and UK.

7.4. Improvement results: “Before” and “After” data.

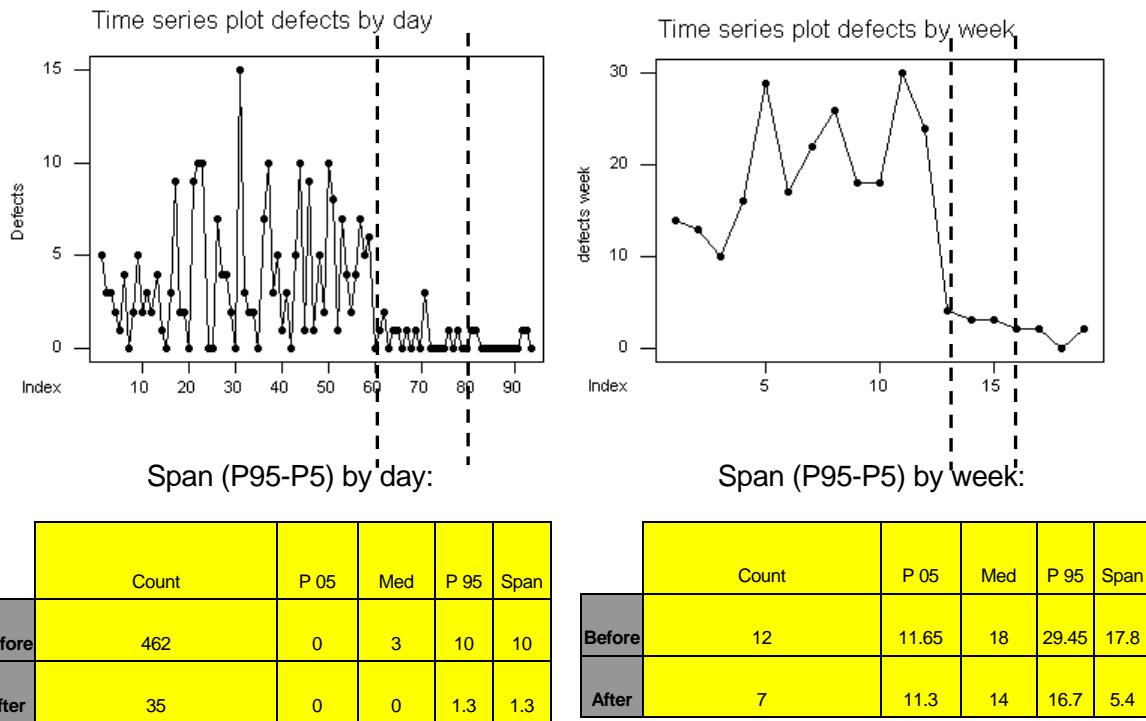
The following results include 7 weeks data: 4 weeks of piloting+ 3 weeks of control. All entities in the scope of the project are included.

Central tendency:

Central tendency measure	Before	After
Median of rejected payments by day	3 defects	0.457 defects
Mean of rejected payments by day	4.017 defects	0 defects
Median of rejected payments by week	18 defects	2.429 defects
Mean of rejected payments by week	19.75 defects	2 defects

Process variation:





Process performance versus customer needs:

Process		Employee Reimbursement									
Month	Defects	Unit	Opt	Total Opt	DPU	DPO	DPMO	Shift	Long Term Capabilit	Sigma	
									Sigma-L		
Rejected payments-Sept	53	1	13844	13844	53.0000	0.003828	3828	1.5	2.67	4.17	
Payment Accuracy- Oct	94	1	29166	29166	94.0000	0.003223	3223	1.5	2.72	4.22	
Payment Accuracy- Nov	110	1	29287	29287	110.0000	0.003756	3756	1.5	2.67	4.17	
Grand Total	257	1		72297	0.003555	3555	1.5	2.69	4.19		
Process		Employee Reimbursement									
Month	Defects	Unit	Opt	Total Opt	DPU	DPO	DPMO	Shift	Long Term Capabilit	Sigma	
									Sigma-L		
Rejected payments-Piloting (4 weeks)	12	1	30959	30959	12.0000	0.000388	388	1.5	3.36	4.86	
Rejected payments-Control (3 weeks)	4	1	22867	22867	4.0000	0.000175	175	1.5	3.58	5.08	
Grand Total	16	1		53826	0.000297	297	1.5	3.43	4.93		



8. Control Phase

8.1. Goals and outputs

The goal of the Control step is to maintain the gains that have been made by standardizing the work methods or processes, anticipating future improvements and preserving the lessons learned from this effort.

The outputs of the Control step include the following:

- Complete documentation of the project.
- A system for monitoring the consistent use of the new method and for checking results.
- Quantification of benefits.
- Learnings and recommendations.

8.2. Control mechanisms to ensure consistency of results

1st control mechanism:

Sigma for accuracy of payments will be included to the actual process sigma calculated and reported in a monthly basis. This metric will be exactly the same metric as the one used in this project:

Process	Employee Reimbursement									
	Month	Defects	Unit	Opt	Total Opt	DPU	DPO	DPMO	Shift	Long Term Capabilit
	D	U	Op	Op	DPU	DPO	DPMO	Shift	Shift	Z.B
Rejected payments-Sept	53	1	13844	13844	53 0000	0 0003628	3628	1.5	2.67	4.17
Payment Accuracy- Oct	94	1	29165	29165	94 0000	0 0003756	3756	1.5	2.67	4.17
Payment Accuracy- Nov	110	1	29267	29267	110 0000	0 0003756	3756	1.5	2.67	4.17
Grand Total	267	1	72297	72297	0 003565	3565	1.5	2.69	4.19	

Process	Employee Reimbursement									
	Month	Defects	Unit	Opt	Total Opt	DPU	DPO	DPMO	Shift	Long Term Capabilit
	D	U	Op	Op	DPU	DPO	DPMO	Shift	Shift	Z.B
Rejected payments-Piloting (4 weeks)	12	1	30959	30959	12 0000	0 0003888	3888	1.5	3.36	4.99
Rejected payments-Control (3 weeks)	4	1	22987	22987	4 0000	0 000175	175	1.5	3.59	5.00
Grand Total	16	1	53826	53826	0 000297	297	1.5	3.43	4.99	

2nd control mechanism:

The following procedures have been updated in the work instructions of ISO material:

T&E process:

- Procedure for processing manual payments: highlighting the importance of not using IBAN.
- Weekly reports: Adding the report for Sweden detecting the potential rejected payments.
- Country specifics updated with bank details structure templates.



CRC:

- Country specifics updated with bank details structure templates.

Banking team:

- Procedure for processing manual payments: highlighting the importance of not using IBAN.
- Country specifics updated with bank details structure templates.

The following procedures are auditable and can be checked in any of the ISO internal audits.

8.3. Project benefits quantification

Project Y defects reduction= 19.75 defects/week-4.07 defects/week=15.68 defects/week = 79%

Expected project Y defects reduction of 50%.

By improving project Y we have improved CTQ's for internal and external customers.

8.3.1. Internal BPO customers: T&E team and banking team.

(CTQ: No rework as an output of the process)

Benefits:

- **\$ Savings/Year:** 50weeks/year*15.68 defects/week * 16.83\$/defect= **\$13194.72/year.**

Expected \$ savings of \$8600.

- Rework time reduction:
T&E team: 50weeks/year*15.68 defects/week * 0.166hrs/defect=**130 hrs/year.**
Banking team: 50weeks/year*15.68 defects/week * 0.25hrs/defect=**196 hrs/year.**

Cost of defects		
Rejected payments		
1 Cost of initial payment	0.33	
2 Cost of reject	10	
3 Cost of manual payment	65	
4 Cost of Transteam (10min)		
5 Cost of payment team(15min)		
		1683

8.3.2. External BPO customers: HP employees

(CTQs: Accurate reimbursement payment and On time reimbursement payment).



Benefits:

- Increase customer satisfaction:

Reduction of customer complaints related to rejected payments of 79%.

Expected reduction of 50%.

Increase of VOC score for CTQs Accurate reimbursement payment and On time reimbursement payment. The increase of VOC score could not be quantified due to the delay in the roll out of the VOC survey for ER.

8.4. System learnings and recommendations

Learning: TRAMS only supports domestic account structures not IBAN structure.

Recommendation to process team designing new reimbursement tool:

The new tool should support transactions using IBAN.

Learning: HR database for Sweden has no bank details on it. Payroll is done from a separate system

Recommendation to process team designing new reimbursement tool:

For Sweden the new tool should be linked not only to the HR database but also to the local payroll system.

Learning: Domestic account structure for Sweden is quite complex.

Recommendation to process team designing new reimbursement tool:

The new tool should support transactions using IBAN.

Recommendation to TRAMS team (BPA):

Changes in the structures may occur: Regular checks of the European committee for banking standards. If any change identified, update the code of the Brio query.

Learning: No format validation checks existed in TRAMS before this project.

Recommendation to process team designing new reimbursement tool:

The new tool should automatically check the format of bank details according to country specifications when any update occurs.



Conclusions

The following conclusions and recommendations are not only based on this project learnings but also in my two and a half years of experience in Six Sigma.

In my opinion there are three reasons that make Six Sigma useful for the business: 1. *The first reason is that Six Sigma DMAIC methodology provides the business with a measurable way to track performance improvements.* By having “before” and “after” improvement data the benefit of the project can be quantified. Having the improvement quantified allows management to act according to the new scenario like, for example, setting new priorities or reorganizing the resources. Also, by having the improvement quantified, the project team members can give visibility of the results of their efforts. 2. *The second reason is that Six Sigma DMAIC methodology improves customer's relationships by addressing defects.* Six Sigma DMAIC methodology is not focused in the average performance of the process. It is based in the defects. It is based in those tail cases generating unhappy customers. 3. *The third reason is that by growing a Six Sigma Culture the business creates process management and process ownership at all organization levels.* By deploying a Six Sigma Culture at all levels people knowing the day-to-day operations will participate and own process changes. People in the process front line are the people that really know the problem and by providing them with basic statistical tools and project management tools the results can be huge.

But implementing the Six Sigma DMAIC methodology/Culture in the business is not an easy task. In my opinion the following factors are critical to the successful deployment: 1. *Management commitment is a must.* Building the culture, training the people, changing the main set requires time. There may be no short-term benefits. Management have to support the initiative, get involved and align the projects to the business needs. 2. *Six Sigma should be a language understood by everyone in the business.* If only the BB and MBB are participating and understanding what is going on the initiative will not be successful. People from operations with a strong knowledge in the process to be improved should be the ones leading the initiatives. BB and MBB should act as coaches providing the team with project management expertise and providing support with statistical tools. *The most important task of MBB and BB is to deploy the religion. It is not about completing successful projects; it is about making the others completing successful projects.*



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