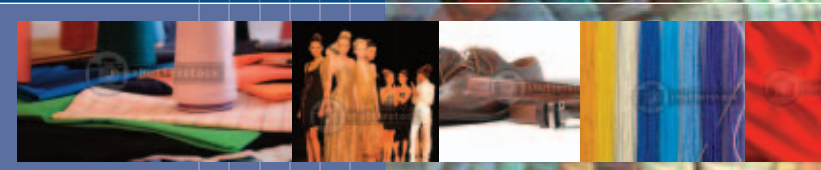
PROJECT EVALUATION FMEA



An Adapted Methodology for a Better Understanding of Successful Project Approaches of SMEs in the Fashion Industry

SIXTH FRAMEWORK PROGRAMME

SEVENTH FRAMEWORK PROGRAMME

Title: PROJECT EVALUATION FMEA – An Adapted Methodology for a Better Understanding of Successful Project Approaches of SMEs in the Fashion Industry

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EXECUTIVE SUMMARY

This manual has been produced thanks to the 6th Framework Programme for Research and Technological Development (FP6) within the F2F – Fashion to Future – project.
Its main objective is to show experiences of FP6 projects, in which SMEs of the Fashion Sector took part. The collection and analyses of information aims to show which are the pays and pitfalls during the phases of project preparation, project running and the time after project completion.
To evaluate the projects, to find the problems, the potential causes and to recommend actions the Failure Modes and Effects Analysis (FMEA) methodology was chosen. For this purpose the original method had to be adapted and refined. The data needed to fill the FMEA were collected via a European wide survey by using a questionnaire that was distributed by Fashion to Future project partners in their respective countries.
All findings of this 'PROJECT EVALUATION FMEA – An Adapted Methodology for a Better Understanding of Successful Project Approaches of SMEs in the Fashion Industry' have been assessed and checked by the project partners in two workshops in October 2006 and in January 2007.
Naturally, this guide cannot cover all possible problems, causes and actions to be taken when designing and carrying out EU RTD projects, but it provides a useful tool to identify, avoid or manage the most common problems and mistakes.

1. PROJECT F2F A BRIEF INTRODUCTION

'Fashion To Future' (F2F) is a project running since May 2006 up to April 2008 co-financed by the EU 6th Framework Programme in order to foster the competitiveness of SMEs in the enlarged Euro-Mediterranean fashion system. The objective is to enable SMEs to participate in future European RTD programmes in order to pursue excellence through research, innovation, technology transfer in fashion system integrated with new technologies.
The main goals of the F2F project are:

- To enhance the competitiveness of SMEs through **simplified access to world wide research & innovation results**;
- To **analyse criticalities and success stories of SMEs participation in FP6** and their contribution in the ERA (European Research Area), including developing guidelines useful to improve future involvement in FP7;
- To **increase the readiness of SMEs and other fashion sector stakeholders to participate in future European RTD programmes** (i.e. FP7) on relevant priority areas, fostering trans-national collaboration;

- To **improve the involvement of SMEs and SMEs groupings from new member states and Third Countries**, through information campaigns, the transfer of best practices, training schemes, trans-national collaboration, etc.;
- To **foster the development a critical mass of new project ideas** and innovation creation support tools;
- To support the objectives of the current and future **technology platforms** related to the fashion actors;

- To **increase cross-linkages** among SMEs or SMEs grouping, and other ETI, to promote networking, cross-fertilisation and clustering.

In order to rise the number of SMEs participating in FP7, project information and experiences have been gathered for detecting the main pays and pitfalls that incurred during proposing, running and after finalising of FP6 projects. This has been done by using a tailored project FMEA, showing the failure modes, that means the ways, or modes, in which something might fail within a European research project. Recommended actions have been deduced out of those failures made in order to prevent those failures and give more SMEs the opportunity to take successful part in FP7 projects.

To know more, it is possible to visit the F2F website: **www.fashiontofuture.eu**.

2. APPROACH
AN FMEA FOR PROJECT EVALUATION

2.1 The Failure Modes and Effects Analysis

2.1.1 History and Use in a Nutshell

Failure Modes and Effects Analysis (FMEA) is a step-by-step approach for identifying all possible failures in a design, a manufacturing or assembly process, or a product or service. Failures are prioritized according to how serious their consequences are, how frequently they occur and how easily they can be detected. The purpose of the FMEA is to take actions to eliminate or reduce failures, starting with the highest-priority ones[1].

Begun in the 1940s by the U.S. military, FMEA was further developed in the 1960s by the aerospace and nuclear power projects, and since the 1980s FMEA is used in automotive industries and has become an integral part of quality management systems.

The FMEA is one of the most popular and a well-proven methods regarding preventive quality assurance and is used to increase system reliability. For products, it can be applied during the initial design phase or to existing equipment[2] and in general FMEA may be used[3]:

- When a process, product or service is being designed or redesigned, after quality function deployment;
- When an existing process, product or service is being applied in a new way;
- Before developing control plans for a new or modified process;
- When improvement goals are planned for an existing process, product or service;
- When analyzing failures of an existing process, product or service;
- Periodically throughout the life of the process, product or service.

[1] *Cf. Tague (2004).*
[2] *Cf. Dodson/Nolan (1995).*
[3] *Cf. Tague (2004).*

2.1.2 The Method

'Failure modes' means the ways, or modes, in which something might fail. Failures are any errors or defects, especially ones that affect the customer, and can be potential or actual[4].

The procedure in general is described by Tague (2004):

1. Assemble a cross-functional team of people with diverse knowledge about the process, product or service and customer needs. Functions often included are: design, manufacturing, quality, testing, reliability, maintenance, purchasing (and suppliers), sales, marketing (and customers) and customer service.
2. Identify the scope of the FMEA. Is it for concept, system, design, process or service? What are the boundaries? How detailed should we be? Use flowcharts to identify the scope and to make sure every team member understands it in detail.
3. Fill in the identifying information at the top of your FMEA form. Table 1 shows a typical format. The remaining steps ask for information that will go into the columns of the form.

Within the following example, shown in Table 1, the function is, Dispense amount of cash requested by customer'. Concerning this function the following failure modes (despite ATM dispenses too much money) could be: does not dispense cash, takes too long to dispense cash, etc.

The following 10 steps have to be followed in order to run an FMEA[5]:

1. Identify the functions of your scope[6]. Ask, 'What is the purpose of this system, design, process or service? What do our customers expect it to do?' Name it with a verb followed by a noun. Usually you will break the scope into separate subsystems, items, parts, assemblies or process steps and identify the function of each.
2. For each function, identify all the ways failure could happen. These are potential failure modes. If necessary, go back and rewrite the function with more detail to be sure the failure modes show a loss of that function.
3. For each failure mode, identify all the consequences on the system, related systems, process, related processes, product, service, customer or regulations. These are potential effects of failure. Ask, 'What does the customer experience because of this failure? What happens when this failure occurs?'
4. Determine how serious each effect is. This is the severity rating, or S. Severity is usually rated on a scale from 1 to 10, where 1 is insignificant and 10 is catastrophic. If a failure mode has more than one effect, write on the FMEA table only the highest severity rating for that failure mode.
5. For each failure mode, determine all the potential root causes. Use tools classified as cause analysis tool, as well as the best knowledge and experience of the team. List all possible causes for each failure mode on the FMEA form.
6. For each cause, determine the occurrence rating, or O. This rating estimates the probability of failure occurring for that reason during the lifetime of your scope. Occurrence is usually rated on a scale from 1 to 10, where 1 is extremely unlikely and 10 is inevitable. On the FMEA table, list the occurrence rating for each cause.
7. For each cause, identify current process controls. These are tests, procedures or mechanisms that you now have in place to keep failures from reaching the customer. These controls might prevent the cause from happening, reduce the likelihood that it will happen or detect failure after the cause has already happened but before the customer is affected.

TABLE 1: FMEA example according to Tague (2004)

Potential failure mode	Potential effect(s) of failure	S	Potential cause of failure	O	Current process controls	D	RPN	CRIT	Recommended actions	Responsability
ATM dispenses too much money	Bank loses money	6	Bills stuck together	2	Loading procedure	7	84	12	-	-
	Discrepancy in cash balancing		Denominations in wrong trays	3	Two person visual verification	4	72	18	-	-

Legend:
S = Severity
O = Occurrence
D = Detection Rating
RPN = Risk Priority Numbers (SOD)
CRIT = Criticality (SO)

[4] Cf. ibid.
[5] Cf. Tague (2004)
[6] From here on, the word 'scope' is used to mean the system, design, process or service that is the subject of your FMEA.

8. For each control, determine the detection rating, or D. This rating estimates how well the controls can detect either the cause or its failure mode after they have happened but before the customer is affected. Detection is usually rated on a scale from 1 to 10, where 1 means the control is absolutely certain to detect the problem and 10 means the control is certain not to detect the problem (or no control exists). On the FMEA table, list the detection rating for each cause.
9. (Optional for most industries) Is this failure mode associated with a critical characteristic? (Critical characteristics are measurements or indicators that reflect safety or compliance with government regulations and need special controls.) If so, a column labelled 'Classification' receives a Y or N to show whether special controls are needed. Usually, critical characteristics have a severity of 9 or 10 and occurrence and detection ratings above 3.
10. Calculate the risk priority number, or RPN, which equals S × O × D. Also calculate Criticality by multiplying severity by occurrence, S × O. These numbers provide guidance for ranking potential failures in the order they should be addressed.
11. Identify recommended actions. These actions may be design or process changes to lower severity or occurrence. They may be additional controls to improve detection. Also note who is responsible for the actions and target completion dates.
12. As actions are completed, note results and the date on the FMEA form. Also, note new S, O or D ratings and new RPNs.

2.2 The Adaptation of FMEA for F2F Project

For the F2F project some modifications of the FMEA method have been made, and they will be shown in this chapter.
First of all the following problems regarding the evaluation of past European RTD projects have been identified that will result by using the 'traditional' FMEA:

- Potential mix-up between 'potential failure mode', and 'potential cause of failure (e.g. deliverable not completed in time).
- Different effects according to the point of view of the evaluating person (e.g. project participants, funding organisation, public view…).
- Failure modes are estimated differently in projects (e.g. IPR issues), i.e. problem of aggregation.
- Difference in control of projects: implementation vs. conception.

In order to overcome at least the first and the last points (potential mix-up and difference in control of projects) the FMEA table has been changed:

1. 'Potential Failure Mode' and 'Potential Failure Effect(s) of Failure' have been subsumed to one column 'Potential Failure Mode';
2. A new column has been created, showing the main phases of a project ('project preparation', 'project running', 'after project completion');
3. The detection rating has been removed, because it was agreed that a failure in a project in general will be either detected or not. And in general problems are detected definitely;
4. Furthermore, the column 'avoidance in project phase' has been included.

These changes led to a different FMEA (see Table 2) filled here with preliminary contents:

TABLE 2: Adapted FMEA

Project Phase	Potential Failure Mode	S	Potential Cause of Failure	O	CRIT	Avoidance in Project Phase(s)	Recommended Actions	In charge of actions
Project preparation	IPRs for developed product not clear	8	Missing or wrong IPR contract	4	32	Project Preparation	Provision of clear IPR contracts (proven by lawyers)	Coordinator
Running of Project	Deliverable not completed	6	Inconsistent Work Plan	2	12	Project Preparation	Cross-chek of proposals	Proposal Writer
After Project Completion	No awareness of project results	8	Dissemination not enough	3	24	Project Preparation, Running of Project, After Project Completion	Clear dissemination goals Review of D.	Proposal writer, coordinator, Reviewer (PO)

3. APPLICATION A SURVEY IN THE TEXTILE AND CLOTHING INDUSTRY

3.1 The Survey and Selected Results

The needed data for the FMEA were collected by the partners of F2F project using a questionnaire (see ANNEX I: The Questionnaire of the Survey) that was distributed and collected in 15 EU countries. Overall 108 questionnaires have been filled referring to 86 different projects[7], i.e. some of the partners referred to the same project:

TABLE 3: Collected questionnaires within the survey

Country	Collected questionnaires
Italy	20
Spain	13
France	11
Greece	9
Romania	5
Lithuania	3
Poland	7
Bulgaria	1
Malta	1
Hungary	3
Portugal	3
Germany	8
Belgium	6
Turkey	4
Czech Republic	14
TOTAL	**108**

The results of the survey showed interesting findings, e.g. why project proposals have been rejected by the reviewers:

- Not enough potential impact (17%);
- Missing quality of coordination (11%);
- Missing quality of the management (9%);
- Resources not well balanced (8%);
- Missing quality of the consortium (6%);
- Objectives not enough specified (6%);

[7] *See ANNEX 2: List of Surveyed Projects (Acronyms).*

- Passed threshold but no money/funding left (5%);
- No proper exploitation plan existing (4%);
- Key partners missing (4%);
- Malfunction of electronic submission (3%);
- Methodology not well defined (3%);
- No relevance of the proposal (2%);
- Economic success after completion not convincingly described (1%).

The mechanisms for the detection of problems within the projects were (multiple answers were possible):

- Internal Review (32%);
- Management Board (30%);
- Central Coordination Control/Steering Committee (24%);
- Quality Plan (17%);
- External Reviews (15%).

Problems that occurred in the phases of project preparation, project running and after completion of project (including their average impact) are shown in Table 4:

TABLE 4: Problems that occurred within projects and their severity

Problems	Project preparation	Project running	After completion of project
Project goals not satisfying			
IPR for project results not clear			
Deliverables not in time			
Financial problems			
Partners left project			
Missing links to other projects			
Too much administration			

Legend: *Very low impact* *Low impact* *Medium impact* *High impact* *Very high impact*

Within Table 5 exemplary actions are listed that have been taken to answer problems:

TABLE 5: Proposed and used actions to solve the problems

Problems	Action(s)
Project goals not satisfying	Careful cross-check since the very beginning of proposal preparation and initiate discussions between all project partners.
IPR for project results not clear	Try to solve the problem internally or get help by asking e.g. external partners.
Deliverables not in time	Internal clearance (e.g. review consistency of timetable) or prolongation of project (without financial compensation).
Financial problems	Review and compare the allocated workload and financial resources for each partner (and eventually allocate it anew). Involve project officer e.g. to find additional financial support.
Partners left project	Replacement of partner by finding a substitute or sub-contractor or allocate its task(s) to the remaining partners (if possible).
Missing links to other projects	Active collaboration with project officer.
Too much administration	Internal solutions have to be found in order to facilitate administrative demand.

The main tools in order to overcome most problems were: Consortium Agreement, Quality plan, project manual, decisions taken by the project management committee or steering committee, external support (by consultancy or National agencies), reporting, re-design of working packages etc.

Controls of the corrective actions have been done:

- under the responsibility of Project Officers and other persons of funding organisations;
- by internal and external reviews (e.g. reports);
- by management committees and/or Steering Committees;
- by permanent technical reviews;
- by internal meetings;
- by supervising actions carried through the coordinator.

3.2 Example Illustrating the Creation of FMEA

Out of the findings of the survey the most relevant potential failure modes were deduced, and they are listed here:

1. Project goals not satisfying;
2. IPR for project results not clear;
3. Deliverables not in time;
4. Partnership not well balanced;
5. Financial Problems;

6. Partner(s) left project;
7. Missing links to other projects;
8. Too much administration;
9. No awareness creation of project results;
10. Inability to submit proposal;
11. Problems with coordination;
12. Structure of work packages not sufficient;
13. Structure of private companies changed;
14. Struggle between departments of one company;
15. Passing person months between work packages;
16. Staff not competent enough.

All the information and findings from the questionnaires were analysed and processed. The data was completed in workshops including all contractual project partners during two partner committee meetings in Malta on October the 26th, 2006 and in Lille on January the 12th, 2007.

The results of the survey and intense discussions in the workshops delivered the potential causes of failure, which were afterwards cross-checked by the project partners. E.g. it was agreed that the failure mode 'project goals not satisfying' has a severity of 4 (classification ranges from insignificant = 1 and medium = 3 up to catastrophic = 5) and has the following possible potential causes of failure:

TABLE 6: Severity and causes of the failure mode 'project goals not satisfying'

Potential failure mode	Severity (S)	Potential causes of failure
Project goals not satisfying	4	Description too general
		Requirements not clear
		Initial goals too ambitious
		No urge (e.g. deliverable) to fulfil the goal
		No means to measure goals
		Lack of experience
		Difficulty to see an application of the results
		Time range not compatible with goals
		Financial problems (budget allocation)

For each of the potential causes of failure their criticality (CRIT = S * O) has been calculated taken into account the project phase (incidence), when the failure occurred (during project preparation (P), during project running (R) or after project completion (C)) and their occurrence rate.

TABLE 7: Incidence, Occurrence Rating and Criticality for each potential cause of failure

Incidence	Occurrence tating (O)	Crit (S*O)
P	3	12
P	2	8
P	3	12
R	2	8
R	4	16
P / R	1	4
R / C	2	8
R	3	12
R / C	4	16

Afterwards, the avoidance (during project preparation or during project running), recommended actions and the person being in charge for implementing them (IP = Industrial Partner, PO = Project Officer, PR = Project Reviewer, PW = Proposal Writer, PE = Proposal Evaluator, CO = Coordinator, WP = WP Task Leader, OCP = Other Consortium Partner, PF =Project Financier and LA = Lawyer) were pointed out.

TABLE 8: Avoidance, recommended action and responsible person for each potential cause of failure

Avoidance project phase	Recommended actions	In charge of in actions
P	Be clear and concise in proposal writing, and cross-check proposal and work programme	PW / CO
P	Careful study of the call, action lines, etc.	PW / CO
P	Make up minds on what is realisable and establish evaluation tools metrics and panels to put in place at project implementation phase	PW / CO
P / R	Cross-check of proposal or clear directives during project running	PW / CO / WP
P	Be prepared to handle the measurement in a qualitative way (e.g. measurement of collaborative working by interviewing partners)	PW / CO
P / R	Training or exchange of responsible	PW / CO
P	Be clear and concise in proposal writing	PW / CO
P	Cross-check of proposal and try to be as clear and precise as possible in describing each other tasks and expected efforts within each Workpackage	PW / CO

3.3 The Project FMEA

Within the following Table 9 all 16 potential failure modes, their potential causes, their incidence, the criticality, the avoidance in project phase, the recommended actions and the people in charge are listed:

TABLE 9: F2F Project FMEA

Pontential Failure Mode	S	Potential Cause of Failure	Incidence (Preparation/ Running/ Completion)	O	CRIT (=S*O)	Avoidance in Project Phase (Preparation /Running)	Recommended Actions	In Charge of Recommended Actions
Project goals not satisfying	4	Description too general	P	3	12	P	Being clear and concise in proposal writing and cross-check of proposal and work programme	PW/CO
		Requirements not clear	P	2	8	P	Careful study call, action lines etc.	PW/CO
		Initial goals too ambitious	P	3	12	P	Making up minds what is realisable and establish evaluation tools metrics and panels to put in place at project implementation phase	PW/CO/WP
		No urge (e.g.deliverable) to fulfill the goal	R	3	8	P/R	Cross-check of proposal or clear directives during running of project	PW/CO
		No means to measure goals	R	2	16	P	Being prepared to handle the measurement in a qulitative way (e.g. measurement of collaborative working by interviewing partners)	PW/CO
		Lack of experience	P/R	1	4	P/R	Trining or exchange of responsible	PW/CO
		Difficulty to see an application of the results	R/C	1	8	P	Being clear and concise in proposal writing	PW/CO
		Time range not compatible with goals	R	2	12	P	Cross-check proposal and try to be as clear and precise as possible in describing each other tasks and expected efforts within each work package	PW/CO
		Financial problems (budget allocation)	R/C	3	16	P	Cross-check of proposal and try to be as clear and precise as possible in describing each other tasks and expected efforts within each work package	PW/CO/LA
IPRs for project results not clear	4	Lack of knowledge (or missing preparation)	P	4	16	P	Awareness creation for that issue and eventually training of people. Every party should clarify what is its pre-know how and expectations regarding shared knowledge generated within the project	CO
		Missing contract	P	4	8	P	Make sure a (standard) contract is available. Consult services such as the IPR Helpdesk if you need basic background information on how to deal with IPR issues	-
		Contract is not followed	P	2	8	-	-	-
		Unforeseen issues (e.g. misunderstanding or wrong description of results/products)	R/C	2	8	-	Guarantee balance between used resources and budget	CO/LA
		Overlapping of laws	P/R/C	2	12	P	Assure that the expertise is available. IPR Helpdesks, National Contact Points, National Legal experts or private lawyers can all help.	-
Deliverables not in time	3	Bad planning (financial constraints)	P	4	12	P	Guarantee balance between used resources and budget	PW/CO
		Bad planning (time management)	P	1	3	P	Guarantee balance between used resources and time frame	PW/CO
		Bad management (e.g. poor communication)	R	3	9	P/R	Install directives that ensure a successful management and appoint anexperienced Project Manager/Coordination Team	PW/CO/PO

TABLE 9: F2F Project FMEA

Pontential Failure Mode	S	Potential Cause of Failure	Incidence (Preparation/ Running/ Completion)	O	CRIT (=S*O)	Avoidance in Project Phase (Preparation /Running)	Recommended Actions	In Charge of Recommended Actions
		Bad performance	R	4	12	R	Allocate to the project personnel/resources which have some relevant skills/technical expertise on the topic and can add value to the project or at least personnel which has a strong motivation/willingness to learn and put forward some progress in the project	CO/WP
		Unforeseen technical issues	R	2	6	-	Allocate to the project personnel/resources which have some relevant skills/technical expertise on the topic and can add value to the project or at least personnel which has a strong motivation/willingness to learn and put forward some progress in the project	CO/WP
		Idle partner(s)	R	1	3	P/R	Allocate to the project personnel/resources which have some relevant skills/technical expertise on the topic and can add value to the project or at least personnel which has a strong motivation/willingness to learn and put forward some progress in the project	CO/WP
		Force majeure	R	1	3	-	Sometimes it can occur that certain activities cannot be carried out within the initially foreseen period. Explain clearly the issue to the Project Officer at the Commission first informally (i.e. on the phone) and make sure you provide all necessary technical details within your periodic Management Report	CO/WP
		No understading of the target	R	1	3	P	Explanation and description of targets, respect, setting of new targets	CO/WP
Partnership not well balanced	4	Loss of partner(s)	P/R	2	8	-	This can happen, especially in projects where a lot of SMEs are involved. Be prepared to go through a lengthy administrative procedure (so called “amendment procedure”) to officialise the exit of company from consortium and eventually the entry of a new partner in it. Make sure that the newly introduced partner understands precisely what is expected from them in terms of efforts and resources to be used	CO / PO
		Very strong partner(s) in the consortium	P/R	3	12	P	Careful selection of partners (in terms of relevant experience, skills, motivation, etc.)	CO
		Wrong impression about partners’	P	2	8	P	Careful selection of partners	CO
		Lack of teamwork	P/R	3	12	P	Motivation of partners	CO
		Lack of experience	R	3	12	P	Careful selection of partners	CO
		Necessary partner was not interested	P	2	8	-	-	-
		Change of organisation	R	1	4	-	-	-
		Imbalance of resources	P/R	2	8	P	Guarantee balance between used resources and tasks of partners	CO/PW
Financial problem	4	Bad planning of budget	P	3	12	P	Guarantee balance between used resources, budget and partners	CO
		Bad management of budget	R	2	8	P/R	Establish financial governance structures	PW/CO
		Cost cutting by EC	R/C	4	16	P	Good documentation of eligible costs	PW/CO
		Payment delays	R/C	2	8	P	Establish financial governance structures	CO/PO
		Low efficiency	R	3	12	P	Motivation of partners	CO
		Financial scope too small (i.e. shifting of travel costs)	R/C	3	12	P/R	Agreement on flexibility regarding the shifting of costs	PW/CO/PO
		Bankruptcy of a partner	P/R/C	1	4	-	-	-

TABLE 9: F2F Project FMEA

Pontential Failure Mode	S	Potential Cause of Failure	Incidence (Preparation/ Running/ Completion)	O	CRIT (=S*O)	Avoidance in Project Phase (Preparation /Running)	Recommended Actions	In Charge of Recommended Actions
		Lack of co-financing	P/R	3	12	P	Be informed about co-financing opportunities in due time. Seek for example information from your National Authorities on potential co-fundings or clarify with your partners since the beginning if a certain amount of 'in kind' is required from their side	CO
		Lack of pre-financing	P	5	20	P	Be aware that the Commission will NOT pay for any time/resources or expense that you have curred at proposal writing stage	PW/CO
		Underfinancing	P/R/C	3	12	P	Good documentation of eligible costs and guarantee balance between used resources and tasks of partners. Choose partners which have some experience in carrying out tasks and/or which have a strong established network within your target groups	CO/PW
		Inexperience in filling in forms	R/C	2	8	R		CO
		Force majeure (e.g. inflation)	R/C	1	4	-		-
Partner(s) left project	3	Internal reasons	P/R/C	3	6	-	-	-
		Disagreements about targets not solved in the consortium	P/R	2	4	P	Being clear and concise in proposal writing and cross-check of proposal	PW/CO
		Financial problem (e.g. bankruptcy)	P/R	2	4	-	-	
		Not enough budget	R	2	4	P	Guarantee balance between used resources and tasks of partners	PW/CO
		No more interested in project	P/R	3	6	P/R	Motivation of partners	CO
Missing links with other projects	3	Too strong focus on own contents of the project	P/R	4	8	P	Awareness creation for a holistic approach	PW/CO
		Competition with other projects	R	2	4	P/R	Linking with similar and complementary projects	PO/PF
		Lack of networking skills	R	2	4	R	Training of partners	CO
		Other projects and materials difficult to find	R	3	6	P/R	Training of partners and bringing together of projects events	CO/PO/PF
		Lack of financial resources	R	4	8	P	Guarantee balance between used resources, budget and partners	PW/CO/PF
		No real common grounds	R	2	4	-		
		Interlocking difficult	P/R	3	6	R	Linking with similar and complementary projects	PO/PF
		Incompetent coordinator or dissemination actor	P/R	1	2	-		
		Missing goals (i.e. awareness missing)	P/R	2	4	P/R	Being clear and concise in proposal writing and cross-check of proposal and/or training of partners	PW/CO/OCP
Too much administration	3	Project Officer too bureaucratic	R	4	12	-	Try to follow the rules at your best. Always make sure you clearly communicate with the partners of the consortium on project administrative developments	CO/WP/OCP
		Coordinator too bureaucratic	P/R/C	3	9	-	There is often a lot of red-tape to be filled in. This is hard and tedious work also for the coordinator himself which usually sits “in the middle” between partners/industrial needs and Commission requests	WP/OCP
		Change of Project Officer or Coordinator		R	3	9	-	
		Delays caused by partner(s)	P/R/C	4	12	R	Setting clear goals and stimulating motivation of partners. Try to include clear sanctionary and voting rules within the Consortium Agreement. When necessary, clarify with partners what are their problems and try to solve them accordingly	CO/WP

TABLE 9: F2F Project FMEA

Pontential Failure Mode	S	Potential Cause of Failure	Incidence (Preparation/ Running/ Completion)	O	CRIT (=S*O)	Avoidance in Project Phase (Preparation /Running)	Recommended Actions	In Charge of Recommended Actions
		Financial guidelines subject to interpretation	P/R	3	9	P	Clarification in advance	CO
		Lack of trust	P/R	2	6	P/R	Integration and motivation of partners	CO
		Lack of tools for administrative activities	R	5	15	P	Normally a lot of them are pre-existing, when partner is experienced. However it might be worth-it to review such tools on a project-to-project basis also in order to adapt it partner's needs/understanding	CO
		Different mentalities	P/R/C	4	12	P	Creation of mutual understanding and trust	CO
No awareness creation of project results	4	Lack of skills regarding dissemination/marketing	R/C	3	12	P	Careful selection of human resources and/or training of partners	CO
		Lack of resources	R	2	8	P	Guarantee balance between used resources and dissemination activities	PW/CO
		Lack of time	R	3	12	P	Guarantee balance between used resources, time and dissemination activities	PW/CO
		Lack of awareness	R	2	8	-		
		Bad products	R	4	16	P/R	Assign dissemination/awareness that allows a well balanced work team with the necessary combination of dissemination and marketing skills	CO
		Bad dissemination plan	P/R	3	12	P	Make sure all partners commit since the beginning in providing inputs to the dissemination plan. Make sure "dissemination and exploitation" points are discussed thoroughly and openly among partners and do not occur as "last points" in the agenda	PW/CO
		Lack of motivation	R/C	2	8	R	Motivation of partners and creation of a collaborative working climate	CO
Inability to submit proposal	5	Electronic submission did not work	P	1	5	P	When using and electronic tool, make sure that you do not wait for the last minute to upload your proposal as so many other people might be trying to do the same and the system could get blocked. Upload of Beta-Versions a few days before. Alternatively, if possible, send the in paper copies	CO
		Missing of deadline	P	1	5	P	Careful reading of the call	CO
		Delay of replies of partners	P	3	15	P	Motivation of partners and showing them the benefits of the project	CO
		Lack of experience	P	3	15	P	Training and/or looking for s.o. who will write the proposal	CO
		No awareness of the call	P	1	5	P	Careful wath of EC News. Put in place some "monitoring" mechanisms (i.e. check regularly the CORDIS website), stay in touch with people/companies wich offer information services, etc.	PW/CO
Problems with coordination	4	Lack of skills/ experience	P/R	2	8	P/R	Training and/or looking for someone who will support the coordinator	CO
		Not enough resources to manage the project	P/R	3	12	P/R	Guarantee to have enough manpower and technology to support management	PW/CO
		No appropriate approach (either too rigid or too flexible)	P/R	3	12	P	Careful selection of projects to participate (OCP) or making partners familiar with the manner of coordination (CO)	OCP/CO
		Role of work package leaders not clear	P/R	3	12	P	Being clear and concise in proposal writing regarding the role of each partner	PW/CO
		Change of coordinator	P/R	2	8	-		
		Lack of teamworks	R	1	4	R	Motivation of partners and establishing of directives/penalties	CO

TABLE 9: F2F Project FMEA

Pontential Failure Mode	S	Potential Cause of Failure	Incidence (Preparation/ Running/ Completion)	O	CRIT (=S*O)	Avoidance in Project Phase (Preparation /Running)	Recommended Actions	In Charge of Recommended Actions
		Not enough engagement	P/R	1	4	R	Motivation of partners and establishing of directives/penalties	CO
		Information policy not correct	P/R	3	12	P/R	Looking for a well balanced consortium and establishing of communication structures and facilities	PW/CO
Structure of work packages	2	Bad planning	P	2	4	P	Being clear and concise in proposal writing and cross-check of proposal	PW/CO
		Low involvement of partners in planning stage	P	3	6	P	Motivation of partners and establishing of directives/penalties	CO
		Bad communication between leaders of work packages tasks	R	2	4	R	Looking for a well balanced consortium and establishing of communication structures and facilities	CO
Structure of private companies changed	2	Merger	P/R	1	2	-	-	-
		Bankruptcy	P/R	1	2	-	-	-
		New Structures	P/R	1	2	-	-	-
Struggle between departments of one partner	1	Companies politics	P/R	2	2	-	-	-
		Changes in management	P/R	2	2	-	-	-
		Lack of communication	P/R	3	3	-	-	-
Passing person months between work packages	2	Bad negotiation	P	2	4	P/R		
		Technical problems	R	3	6	P	Creation of a climate of agreement on flexibility	CO
		Financial problems	R/C	3	6	R	Agreement on flexibility regarding the shifting of costs	PW/CO/ PO
Staff not competent enough	3	Recruitment procedure not sufficient	P/R	2	6	P	Training and a clear profile of the work to be done	PW/CO/ PO
		Bad communication	P/R	3	9	P	Training concise governance structures and clear profile of the work to be done	CO/IP
		Lack of human resources (skills/ lack of training)	R	4	12	P	Training and a clear profile of the work to be done	CO/IP
		Lack of training	R	4	12	P	Training and a clear profile of the work to be done	CO/IP
		Lack of appeal of EC projects (i.e.lak of interest)	P/R	3	9	P	Bring the idea of the project home to the partners	PW/CO
		Poor menagement	R	1	3	P	Careful selection of human resources and establishing of governance of structures	PW/CO

4. CONCLUSIONS

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The project evaluation FMEA as an adapted methodology for a better understanding of successful project approaches of SMEs in the Fashion Industry delivers at first a kind of guide where possible failures, their causes and their criticalities may be identified and assessed. Failures during all phases of a project life cycle (preparation, running and after project) occur and may be sometimes avoided but sometimes not (e.g. 'struggle between departments of one partner').
Therefore the intention of the guide is threefold:

- To create awareness for failures and their potential causes in order to try to prevent them;
- To point out how severe and critical potential failures may be;
- To show how they can be eliminated by offering solutions ('recommended actions') for different causes.

All the failures, severity, their causes, incidence and occurrence have been worked out by experts of different European countries after a survey using a questionnaire that was filled by industrial partners, universities, research centers, project reviewers and a project officer. It is the expertise of a big range of European research projects, made in FP6 that has provided the input and may help other projects partners, especially SMEs form the textile and clothing industries, to start, to run and to complete in a smooth and successful way projects in the FP7.

Furthermore, the authors would like to refer to another guide that was developed during the F2F project: 'BEST PRACTICE MANUAL – A Guide to develop successful EU Research and Development Projects for SMEs in the Fashion Industry' (www.fashiontofuture.eu), which offers valuable ideas and shows selected Best Practice Cases of European projects as well as fashion funding opportunities in FP7.

REFERENCES
Tague, N.R. (2004), The Quality Toolbox, Edition, ASQ Quality Press, 2004, pages 236-240.
Dodson, B. and Nolan, D. (1995), The Complete Guide to the CRE, Tucson 1995.

ANNEX

ANNEX I

F2F - Questionnaire for Project FMEA

General

Country _____ **Organisation (optional)** _____

1. If the project proposal has been rejected, please tick the reasons
❑ No Relevance of the Proposal ❑ Missing Quality of Coordination ❑ Not enought Potential Impact
❑ Missing Quality (Consortium) ❑ Missing Quality (Management) ❑ Resources not well balanced
❑ Other, please specify

_____

2. If the project was accepted, which was your role within the project?
❑ Industrial Partner ❑ Project Officer ❑ Project Reviewer ❑ Proposal Writer
❑ Prroposal Evaluator ❑ Coordinator ❑ Research Partner

3. In your opinion, was the project successful?
❑ Yes ❑ No. Please specify

4. Were there any mechanism for problem detection established in the project?
❑ Quality Plan ❑ Internal Reviews ❑ Exsternal Reviews ❑ Management Board
❑ Central Coordination Control ❑ Other, please specify

_____

Identification of Problems

5. Which problems emerged during the project and in which phase of the project?

Problems	Project Preparation	Running of Project	After Project Completion
Project goals not satisfying	❑	❑	❑
IPR for project results not clear	❑	❑	❑
Deliverables not in time	❑	❑	❑
Partnership not well balanced	❑	❑	❑
Financial problems (e.g. budget too low)	❑	❑	❑
Partner(s) left project	❑	❑	❑
Missing links with other projects	❑	❑	❑
Too much administration	❑	❑	❑
Not relevant and useful achievements	❑	❑	❑
No awareness creation of project results	❑	❑	❑
Others, please specify	❑	❑	❑

_____

F2F - Questionnaire for Project FMEA

6. How serious were these problems for the project?

	Very Low impact	Low impact	Medium Impact	High Impact	Very High Impact
Project goals not satisfying	❑	❑	❑	❑	❑
IPR for project results not clear	❑	❑	❑	❑	❑
Deliverables not in time	❑	❑	❑	❑	❑
Partnership not well balanced	❑	❑	❑	❑	❑
Financial problems (e.g. budget too low)	❑	❑	❑	❑	❑
Partner(s) left project	❑	❑	❑	❑	❑
Missing links to other projects	❑	❑	❑	❑	❑
No awareness creation of project results	❑	❑	❑	❑	❑
Others, please specify	❑	❑	❑	❑	❑

Solution of Problems

7. Which actions have been taken to solve the problems? Please specify?

8. Which utilities have been available to solve the problems?

❑ Consortium Agreement(IPR) ❑ Quality Plan ❑ Problem Solution Manual ❑ Arbitrative Board
❑ Others, please specify

9. Who took part in problem solving?

❑ Industrial Partner ❑ Project Officer ❑ Project Reviewer ❑ Proposal Writer
❑ Proposal Evaluator ❑ Coordinator ❑ WP/Task Leader ❑ Other Consortium Partner
❑ Project Financier ❑ Lawyer ❑ Others, please specify

10. Have there been any control of the problem solving actions? Please specify

Thank you for your cooperation!

ANNEX II

List of Surveyed Projects (Acronyms)

No.	ACRONYM	No.	ACRONYM
1	Agrobiotex	44	Intrinsic
2	Avalon	45	Ite
3	Base	46	Leapfrog
4	Bentex	47	Meda
5	Biocat	48	Meld
6	Biomatex	49	Microdye
7	Bioprocessing	50	Moda ML
8	Biosurf	51	Mutatex
9	Braincoat	52	Nafibiotech
10	Cargotextil	53	Netfintex
11	CEC-Made-Shoe	54	Nice
12	Cedenox	55	Nobugs
13	Chitomed	56	Openhamptech
14	Clodesigndatabank	57	Osteovip
15	Coltex	58	Oxiboost
16	Ctec	59	Pandora
17	Demes	60	ParcoGarden
18	Digitex	61	Penelope
19	Dinis	62	Persona
20	Dirtex	63	Peware
21	dynamokidshoe	64	Polito
22	Edy	65	Procloth
23	EMS-Textile	66	Proetex
24	Envishoe	67	Promotex
25	Ergoshoe	68	Qskintoll
26	eukidshoe	69	Restex
27	Euroshoe	70	Seamless
28	Fabiotex	71	Seat
29	Fashion Net	72	See-innovation
30	Fastt	73	Shoe5000
31	Flameretreat	74	Shoenet
32	Flexifunbar	75	Smartshoe
33	Flexrap	76	Space2Tex
34	Focus	77	Sunprotex
35	Fomipe	78	Synapps
36	Funfinish	79	Technopolis
37	Giromat	80	TechOnline
38	heelsimtool	81	Textile
39	Hipermax	82	TR-Access
40	Infoot	83	Tsonta
41	Innorubber	84	Ultratec
42	Innosafety	85	Webtextpert
43	Innotex	86	Welltex

ANNEX III

F2F Project Partners

No.	PARTNER NAME	PARTNER WEB SITE
1	IPI - Istituto per la Promozione Industriale (Coordinator – Italy)	www.ipi.it
2	EURATEX – European Apparel and Textile Organisation – (Belgium)	www.euratex.org
3	CLOTEFI – Clothing Textile and Fiber Technological Developments – (Greece)	www.etakei.gr
4	INESCOP – Istituto Tecnologico del Calzado y Conexas – (Spain)	www.inescop.es
5	BPM – Business and Project Management – (Greece)	www.bpm.gr
6	D'APPOLONIA Spa – (Italy)	www.dappolonia.it
7	APRE – Agenzia per la Promozione della Ricerca Europea – (Italy)	www.apre.it
8	Universiteit Gent (Ghent University) – (Belgium)	http://textiles.ugent.be
9	INOTEX Ltd – (Czech Republic)	www.inotex.cz
10	IFTH – Institut Français du Textile et de l'Habillement – (France)	www.ifth.org
11	UFIH – Union Français des Industries de l'Habillement – (France)	www.lamodefrancaise.org
12	LATIA – Lithuanian Apparel and Textile Industry Association – (Lithuania)	www.latia.it
13	ASINTEC – Asociación para la Incorporación de las Nuevas Tecnologias en la Empresa – (Spain)	www.asintec.org
14	AITEX – Asociación de la Investigación de la Industria Textil – (Spain)	www.aitex.es
15	DITF-MR – Deutsche Institute fuer Textil - und Faserfoschung Denkendorf – (Germany)	www.ditf-denkendorf.de/mr
16	IAT – Instytut Architektury Tekstylion (Institute of Textile Architecture) – (Poland)	www.iat.com.pl
17	INNOVATEXT -Textile Engineering and Testing Institute Co. – (Hungary)	www.innovatext.hu
18	ARC Fund – Applied Research and Communications Fund – (Bulgaria)	www.arcfund.net
19	LTC – Latvijas Tehnolo iskais Centrs (Latvian Technological Center) – (Latvia)	www.innovation.lv/ltc/eng_ default.htm
20	EUREXCEL– The European Association of Innovating SMEs – (United Kingdom)	www.eurexcel.org
21	IRMCo – Integrated Resources Management Company Ltd – (Malta)	www.environmentalmalta.com
22	CITEVE – Centro Tecnològico das Indùstrias Textil e do Vestuario de Portugal – (Portugal)	www.citeve.pt
23	MMU –The Manchester Metropolitan University – (United Kingdom)	www.hollings.mmu.ac.uk

F2F Project Partners

No.	PARTNER NAME	PARTNER WEB SITE
24	AEC – Asociacion Espanola de Empresas de Components para el Calzado – (Spain)	www.aeecc.com
25	CGS – C.G.S. di Coluccia Michele & C s.a.s – (Italy)	www.cgsgroup.it
26	CTCA – Centro Tecnológico do Calçado – (Portugal)	www.ctcp.pt
27	CTC – Centre Technique du Cuir, Chaussure et Maroquinerie – (France)	www.ctc.fr
28	TTX – Tecnotessile - Società Nazionale di Ricerca Tecnologica S.r.l. – (Italy)	www.tecnotex.it
29	INCDTP – The Research Development National Institute for Textile and Leather – (Romania)	www.certex.ro
30	CITER – Centro Innovazione Tessile dell'Emilia Romagna – (Italy)	www.citer.it
31	TECNOPOLIS CSATA Scrl – (Italy)	www.tno.it
32	CNCC – Centre National du Cuir et de la Chaussure – (Tunisia)	www.cnccleather.nat.tn
33	OSEO – (France)	www.oseo.fr
34	KOSGEB – Small and Medium Industry Development Organisation – (Turkey)	www.kosgeb.gov.tr
35	PIOT – Polska Izba Odziezowo-Tekstylna (Polish Federation of Apparel & Textiles) – (Poland)	www.textiles.pl
36	CETTEX – Centre Technique du Textile – (Tunisia)	www.textiletunisia.com.tn/htm/fr-index.htm
37	ANPME – Agence National pour la Promotion de la Petite et Moyenne Entreprise – (Morocco)	www.anpme.ma
38	AMITH – Association Marocaine des Industries du Textile et de l'Habillement – (Morocco)	www.amith.org.ma

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