



Education and Culture

Leonardo da Vinci

**RECOGNITION OF NEEDS AND CREATION OF PROFESSIONAL TRAINING IN THE AREA OF
PREPARATION AND MANAGEMENT OF INFRASTRUCTURE CONSTRUCTION PROJECTS FINANCED
BY THE EUROPEAN UNION**

No: PL/04/B/P/PP/-174 417

Work Package II Report

July 2005

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1. Introduction

This document reports the results of Work-Package II of the Leonardo da Vinci project entitled: “Recognition of needs and creation of professional training in the area of preparation and management of infrastructure construction projects” financed by the European Union (PL/04/B/P/PP/-174 417). The report covers the results of the work conducted by:

- WUT - Warsaw University of Technology (Poland)
- PBCP – Polish British Construction Partnership (Poland)
- SIDIR – Polish Association of Consulting Engineers and Experts (Poland)
- UMINHO – University of Minho (Portugal)
- VGTU – Vilnius Gediminas Technical University (Lithuania)
- PUV – Polytechnic University of Valencia (Spain)

The purpose of WP II is to recognise the training needs among engineers and managers in the countries involved. Results will contribute for the development of a series of CPD (Continuing Professional Development) courses in the area of management of infrastructure projects.

The intent is to push forward a tool assisting engineers and managers in solving common problems they face in construction. Subsequently, know-how can be improved, enhancing the project’s performance and in turn diminishing reasons for claims and disputes that frequently arise in the construction industry due to lack of quality, cost overruns, delays, etc..

2. Results from Work-package II

2.1 Focus Group

The participation in the inquiries conducted in partner countries revealed a reasonable interest in the topic by the industry. Therefore, it was decided that the creation of focus groups should be delayed so that experts could benefit from data collected. Accordingly, partners foresee the creation of focus groups in each country, with participants from various organisations within the construction industry, in the near future.

2.2 Questionnaire

Each partner used the questionnaire proposed in the first partners' meeting in Warsaw, adjusting it to reality of the construction industry in their own country.

UMINHO made a small adjustment in the table "Type of Organisation" from which the column for the specification of the number of managers has been suppressed. This is because it was considered that this aspect is not applicable to the Portuguese industry. Accordingly, only one column was created for the specification of the number of engineers and/or managers (annex 1).

The Polish partners adopted the proposed questionnaire without any amendments (annex 2).

Although PUV added two more tables, results obtained were included in their report only as a general reference. The aspects inquired were as follows (annex 3):

- Main activities of the company or public agency; three maximum to be chosen from: roads, hydraulic works, urban development, environmental engineering, building, marine works, industrial facilities, and other.
- Most important training needs (or deficiencies detected) in construction management: five maximum to be chosen among the same as in question C1 ("the most important management disciplines in construction").

VGTU added an additional question on the importance of construction management in the implementation of infrastructure construction projects and an additional table for selecting five organisation working ranges amongst the 10 proposed (annex 4).

The questionnaire was structured in order to obtain information on organisations inquired and also their opinions, interests and needs, namely:

- organization type:
 - Contractor

- Consultant / Project Manager
- Governmental Organisation/Local Authorities
- Private Investor / Client / Developer
- Professional Associations related to Construction
- Other
- number of staff: managers and/or engineers
- opinion on most relevant management areas in construction:
 - Project Conception Development / Feasibility
 - Planning and Scheduling
 - Risk Management
 - Corporate Marketing
 - Project Cost Estimation and Cost Management
 - Quality Management
 - Procurement and Tendering Procedures
 - Contract Conditions
 - Joint Ventures / Partnering (PPP)
 - Health and Safety Management
 - Handing Over / Guarantee Period
 - Environmental Management
 - Other
- information on courses already provided for the organization staff in the area of management in construction in the last three years: type of course (internal, external, distance learning), number of participants in each course, subject of the course.
- interest in training courses in the area of management in construction
- opinion on the most relevant type of courses: internal, external, distance learning.
- opinion on the number of future participants the organization estimates would attend training course in the area of management in construction.

The questionnaires were distributed to various entities linked to the construction industry, from public to private, small to big companies, and naturally covering the main construction activities (civil and industrial construction, urban development projects, airports, roads, bridges, etc..).

Information, resulting from the questionnaires received from the construction industry of each country, is summarized in the tables and graphs that follow.

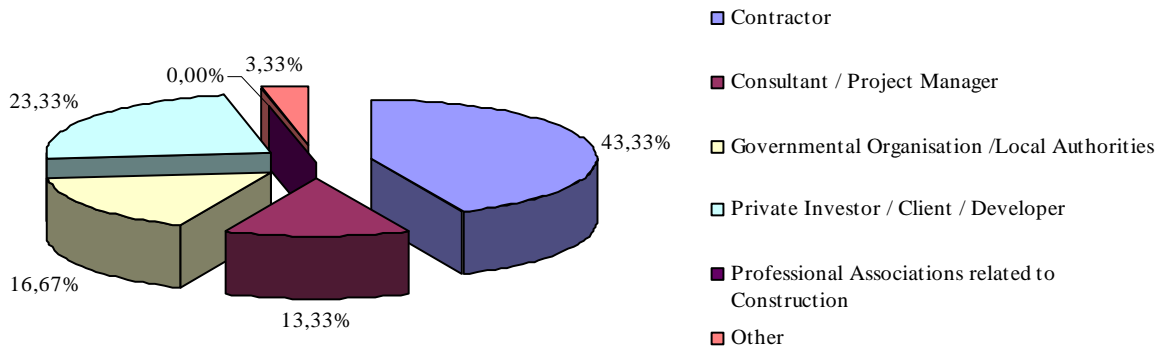
2.3 Type of Organisation

The tables and graphs below illustrate the weight of the organisation type within the construction industry for each country.

2.3.1 Portugal

Table 1: Weight of organisation type in Portugal

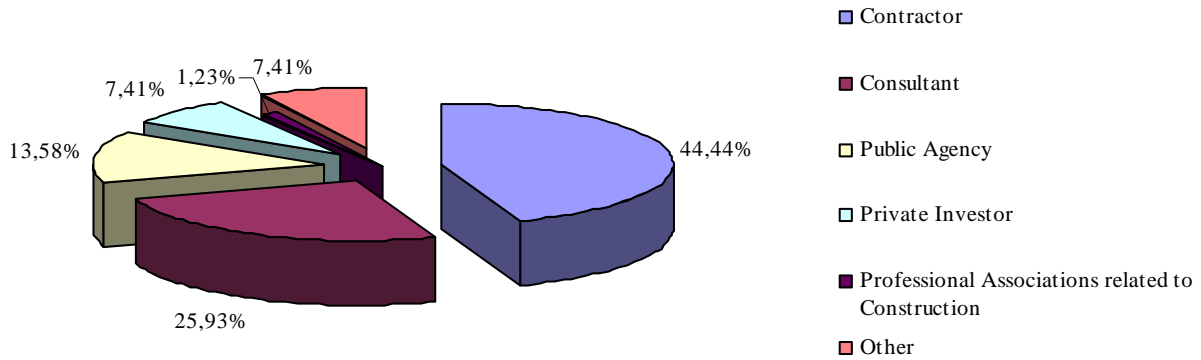
Type of organisation	Number of employees				Total	Weight of organisation %
	<5	5--50	50-250	>250		
Contractor	0	3	6	4	13	43,33%
Consultant / Project Manager	0	1	2	1	4	13,33%
Governmental Organisation / Local Authorities	0	3	0	2	5	16,67%
Private Investor / Client / Developer	0	3	3	1	7	23,33%
Professional Associations related to Construction	0	0	0	0	0	0,00%
Other	0	0	1	0	1	3,33%
TOTAL	0	10	12	8	30	100%



2.3.2 Poland

Table 2: Weight of organisation type in Poland

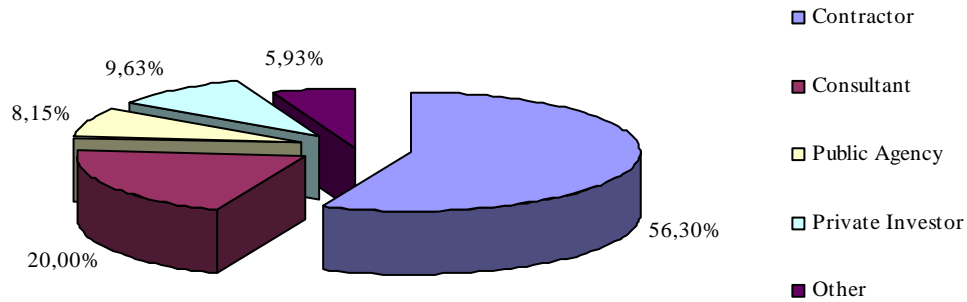
Type of organisation	Number of employees				Total	Weight of organisation %
	<5	5--50	50-250	>250		
Contractor	21	13	1	1	36	44,44%
Consultant	13	8	0	0	21	25,93%
Public Agency	6	3	2	0	11	13,58%
Private Investor	6	0	0	0	6	7,41%
Professional Associations related to Construction	1	0	0	0	1	1,23%
Other	1	2	3	0	6	7,41%
TOTAL	48	26	6	1	81	100%



2.3.3 Spain

Table 3: Weight of organisation type in Spain

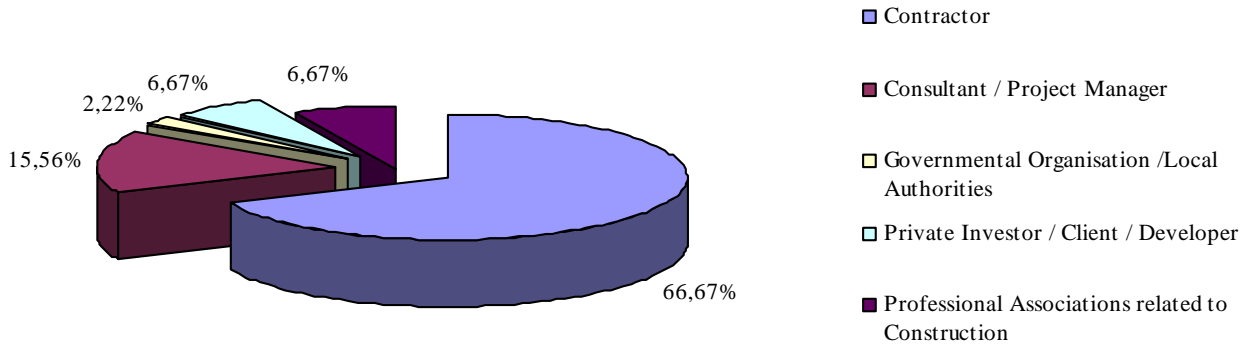
Type of organisation	Number of employees				Total	Weight of organisation %
	<5	5--50	50-250	>250		
Contractor	1	12	44	19	76	56,30%
Consultant	3	12	6	6	27	20,00%
Public Agency	0	3	2	6	11	8,15%
Private Investor	0	5	8	0	13	9,63%
Other	0	4	3	1	8	5,93%
TOTAL	4	36	63	32	135	100,00%



2.3.4 Lithuania

Table 4: Weight of organisation type in Lithuania

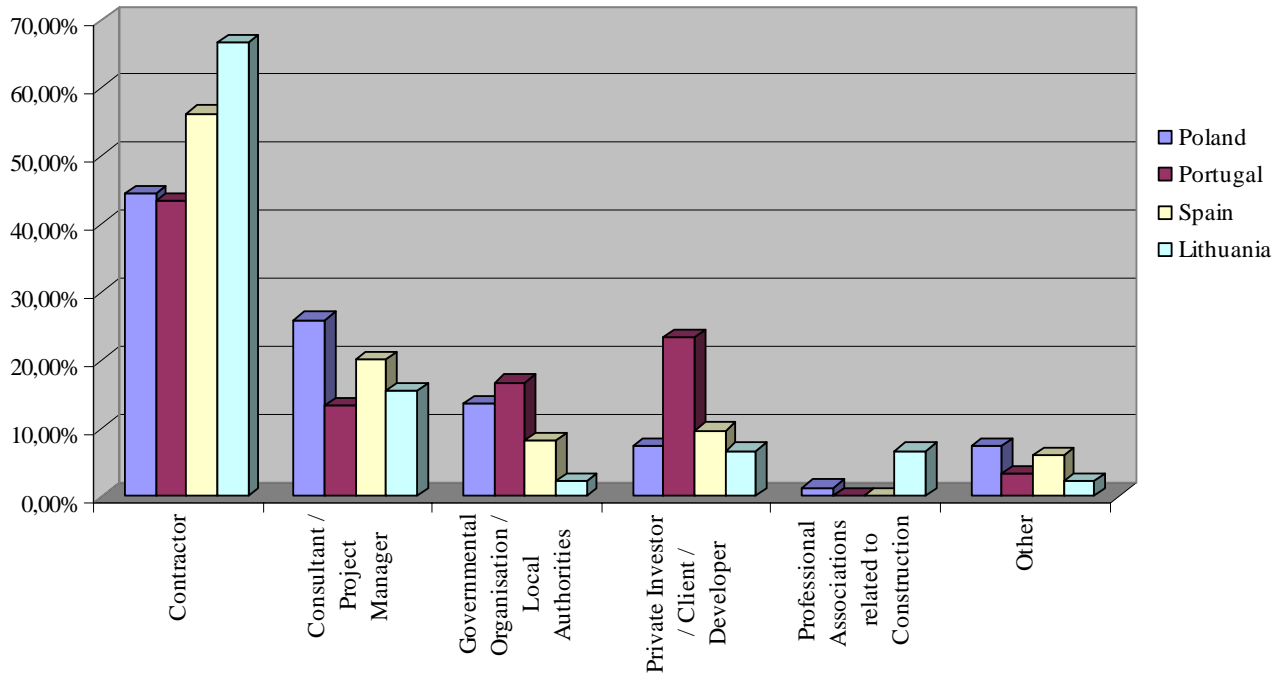
Type of organisation	Number of employees				Total	Weight of organisation %
	<5	5--50	50-250	>250		
Contractor	1	6	15	8	30	66,67%
Consultant / Project Manager	1	4	2	0	7	15,56%
Governmental Organisation / Local Authorities	0	0	1	0	1	2,22%
Private Investor / Client / Developer	0	3	0	0	3	6,67%
Professional Associations related to Construction	1	2	0	0	3	6,67%
Other	0	0	1	0	1	2,22%
TOTAL	3	15	19	8	45	100%



2.3.5 Aggregate Results

Table 5: Summary table on the weight of the organisation type in the four countries

Type of organisation	Weight of organisation (%)			
	Poland	Portugal	Spain	Lithuania
Contractor	44,44%	43,33%	56,30%	66,67%
Consultant / Project Manager	25,93%	13,33%	20,00%	15,56%
Governmental Organisation / Local Authorities / Public Agencies	13,58%	16,67%	8,15%	2,22%
Private Investor / Client / Developer	7,41%	23,33%	9,63%	6,67%
Professional Associations related to Construction	1,23%	0,00%	0,00%	6,67%
Other	7,41%	3,33%	5,93%	2,22%



2.4 Relevant Management Areas Selected Within Each Type of Organization

The tables and graphs below illustrate the opinions on the most relevant management areas, selected by each type of organization, for each country.

2.4.1 Portugal

Table 6: Number of responses/Organisation type - Portugal

Management areas	Contractors	Consultant / Project Manager	Governmental Organisation / Local Authorities	Private Investor / Client / Developer	Other
Project's Conception Development / Feasibility	2	2	3	5	0
Planning and Scheduling	13	2	4	7	1
Risk Management	2	2	2	1	0
Corporate Marketing	1	1	0	2	0
Project Cost Estimation and Cost Management	13	4	4	6	1
Quality Management	9	4	3	4	1
Procurement and Tendering Procedures	4	2	1	5	1
Contract Conditions	3	2	1	3	1
Joint Ventures / Partnering (PPP)	6	0	2	1	0
Health and Safety Management	10	4	3	3	1
Handing Over / Guarantee Period	6	2	0	5	0
Environmental Management	7	3	1	2	1
Other	0	1	0	0	0

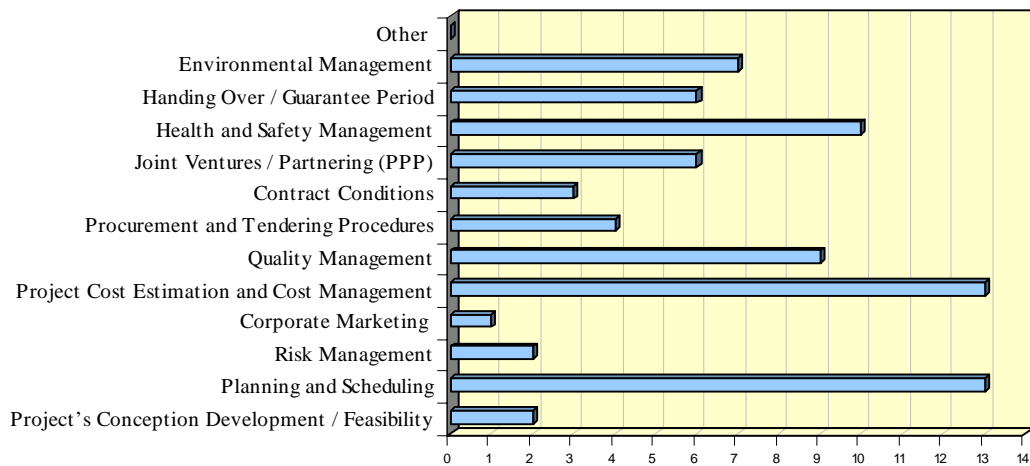


Figure 1: Relevant management areas selected by *Contractors*

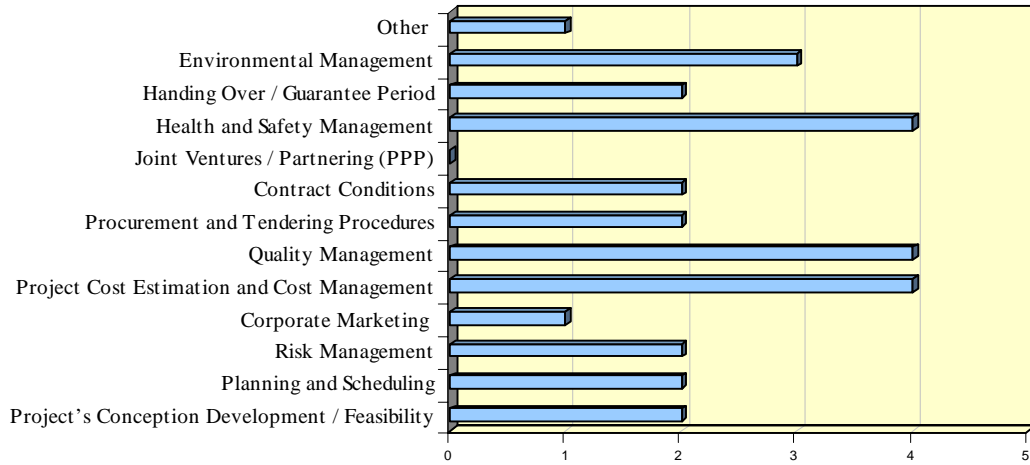


Figure 2: Relevant management areas selected by *Consultants/Project managers*

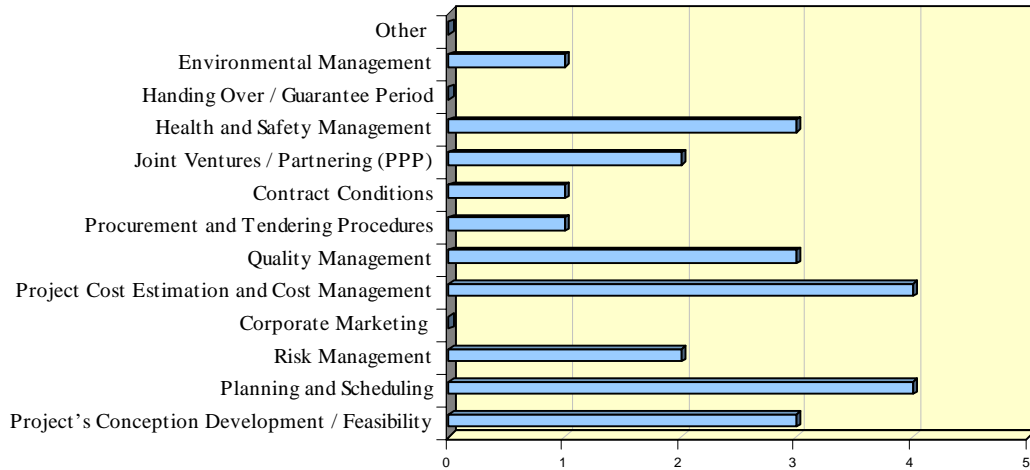


Figure 3: Relevant management areas selected by *Governmental Organisation/Local Authorities*

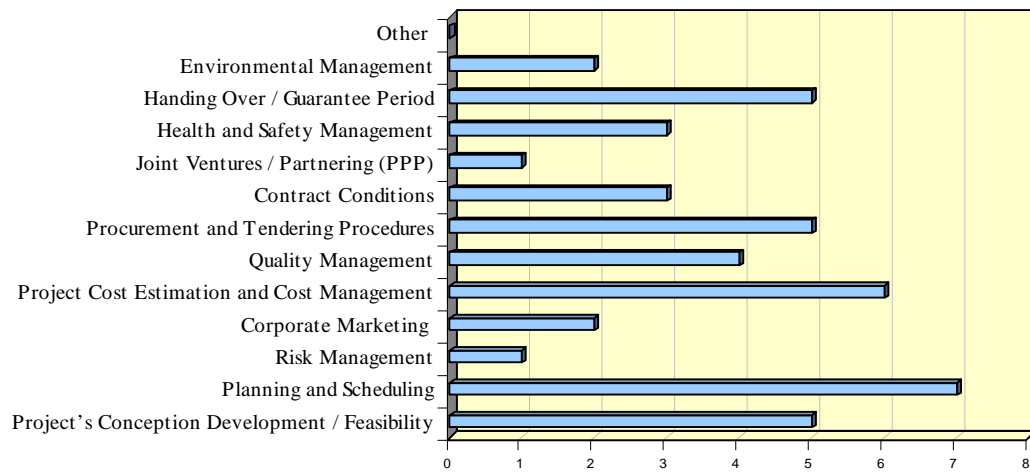


Figure 4: Relevant management areas selected by *Private Investor/Client/Developer*

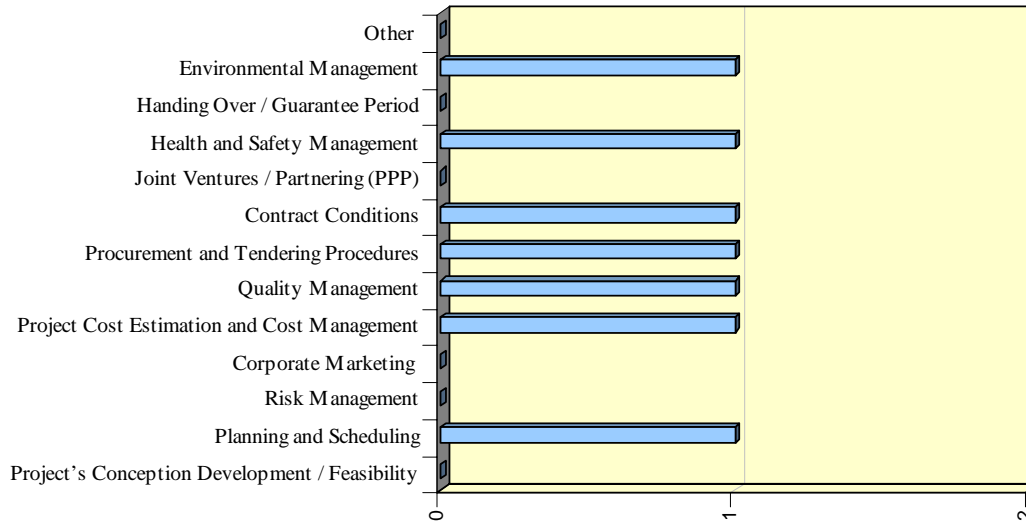


Figure 5: Relevant management areas selected by *Other*

Table 7: Most relevant management areas for each type of organization - Portugal

Type of organization	Contractors	Consultants/ Project managers	Governmental Organisation/ Local Authorities	Private Investor/ Client/ Developer	Other
Project Cost Estimation and Cost Management	●	●	●	●	●
Health and Safety Management	●	●	●		●
Planning and Scheduling	●		●	●	●
Quality Management	●	●	●		●
Project's Conception Development / Feasibility			●	●	
Procurement and Tendering Procedures				●	●
Handing Over / Guarantee Period				●	
Environmental Management		●			●

2.4.2 Poland

Table 8: Number of responses/Organisation type - Poland

Management areas	Contractors	Consultant	Public Agency	Private Investor	Professional Associations Related to Construction	Other
Project's Conception Development / Feasibility	20	13	5	2	1	4
Planning and Scheduling	21	8	3	2	0	4
Risk Management	21	9	6	2	0	0
Corporate Marketing	13	6	2	1	0	0
Project Cost Estimation and Cost Management	16	11	7	4	0	5
Quality Management	15	10	2	1	1	1
Procurement and Tendering Procedures	16	11	7	3	1	4
Contract Conditions	16	11	7	3	0	5
Joint Ventures / Partnering (PPP)	10	6	4	4	0	0
Health and Safety Management	7	3	2	2	1	1
Handing Over / Guarantee Period	14	9	5	3	1	2
Environmental Management	8	9	0	1	0	0
Other	0	0	1	2	0	2

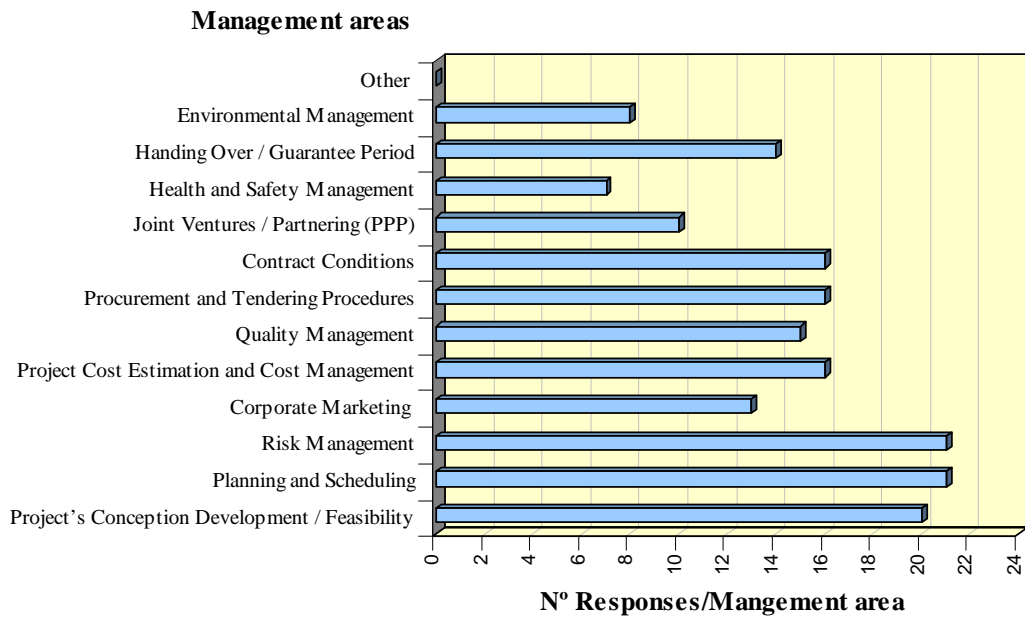


Figure 6: Relevant management areas selected by *Contractors*

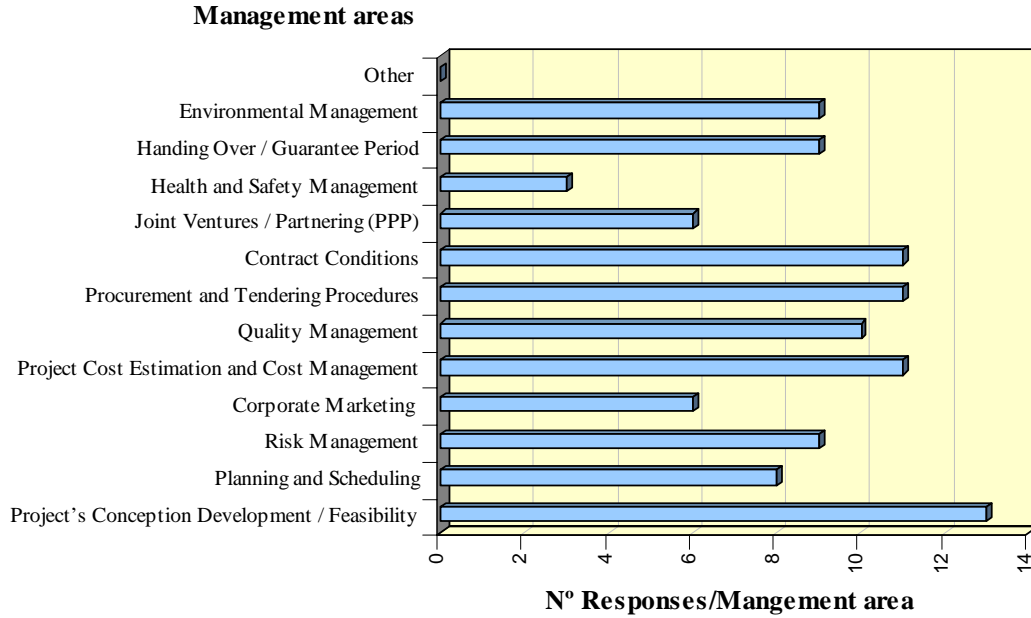


Figure 7: Relevant management areas selected by *Consultants*

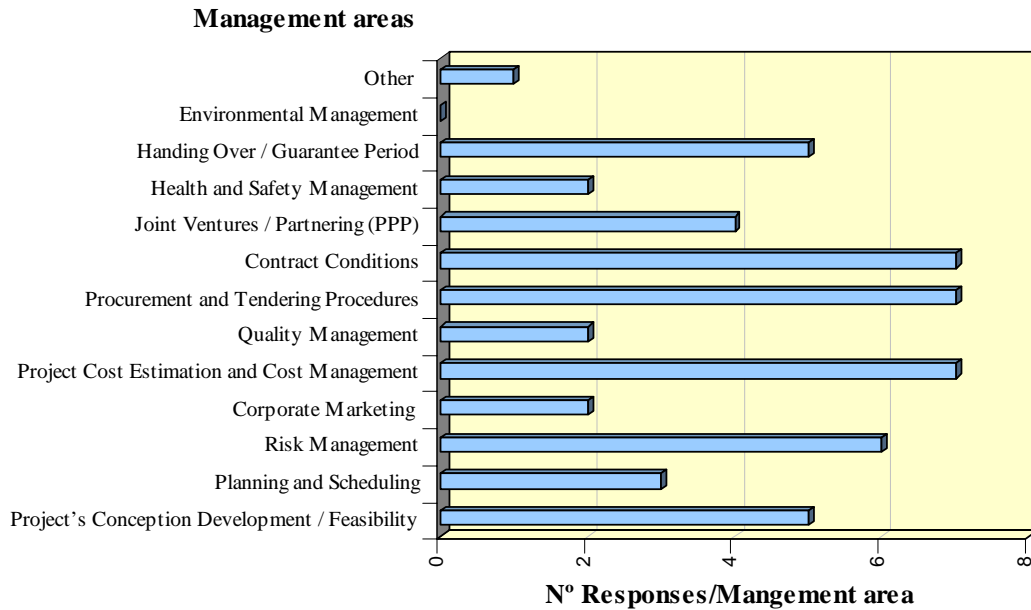


Figure 8: Relevant management areas selected by *Public Agencies*

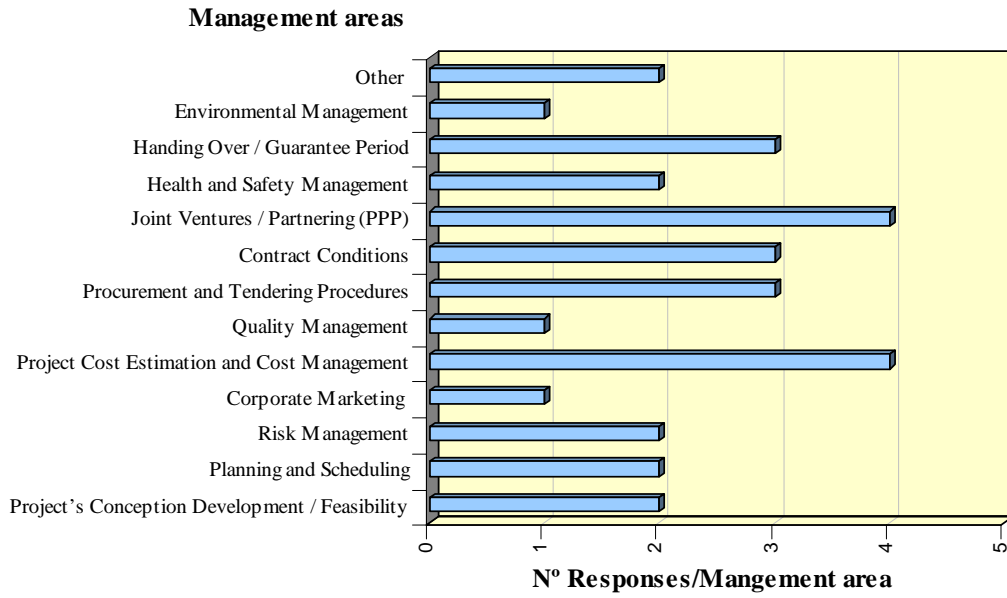


Figure 9: Relevant management areas selected by *Private Investors*

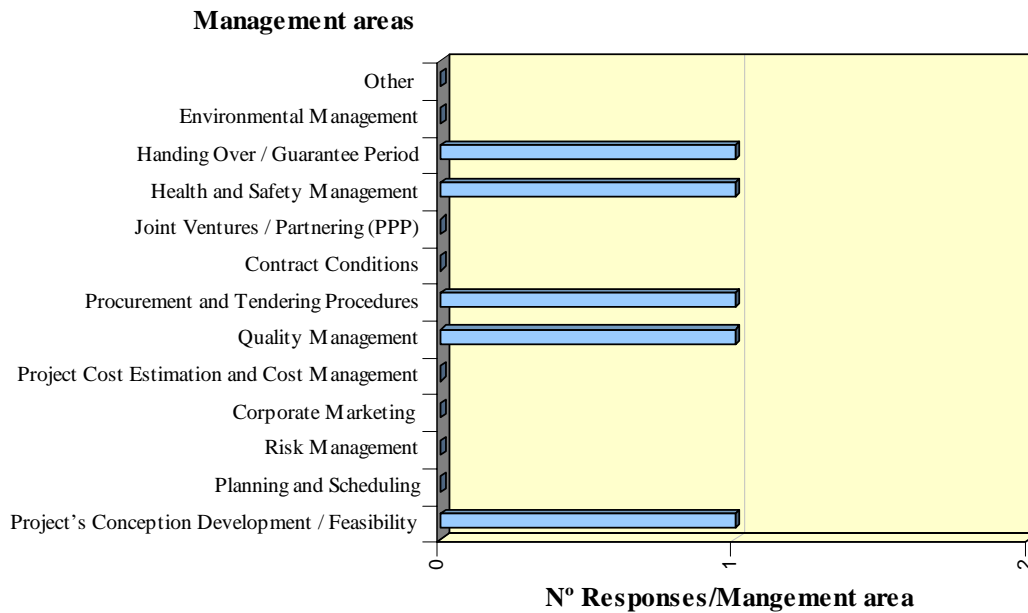


Figure 10: Relevant management areas selected by *Professional Associations related to Construction*

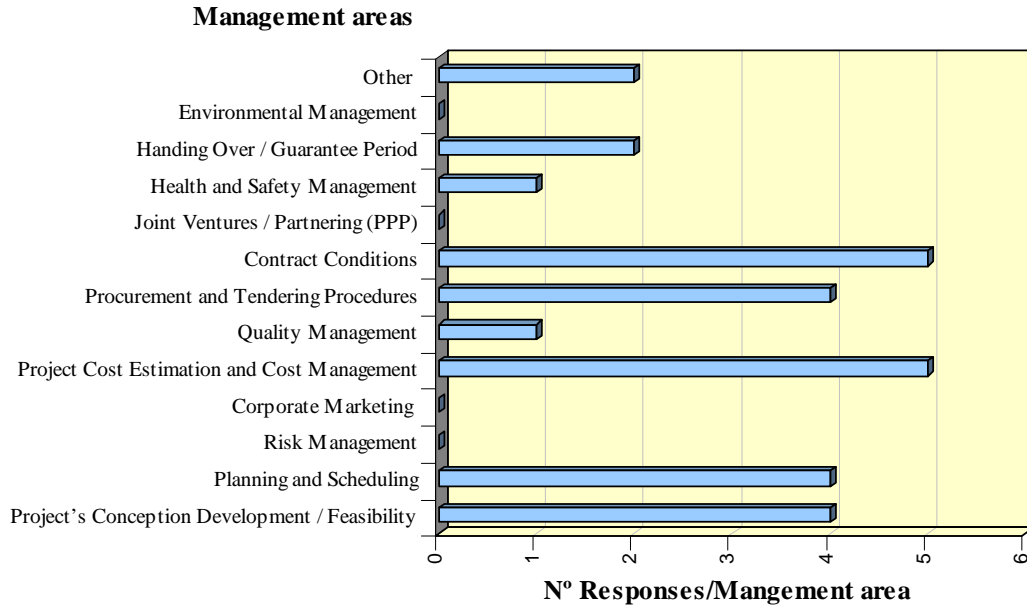


Figure 11: Relevant management areas selected by *Others*

Table 9: Most relevant management areas for each type of organization - Poland

Management areas	Contractors	Consultant	Public Agency	Private Investor	Professional Associations Related to Construction	Other
Project Cost Estimation and Cost Management		●	●	●		●
Procurement and Tendering Procedures		●	●		●	
Project's Conception Development / Feasibility	●	●			●	
Contract Conditions		●	●			●
Risk Management	●		●			
Quality Management					●	
Health and Safety Management					●	
Handing Over / Guarantee Period					●	
Joint Ventures / Partnering (PPP)				●		
Planning and Scheduling	●					

2.4.3 Spain

Table 10: Number of responses/Organisation type - Spain

Management areas	Contractors	Consultant	Public Agency	Private Investor	Other
Project's Conception Development / Feasibility	25	12	5	8	1
Planning and Scheduling	65	23	9	8	7
Risk Management	15	8	0	5	4
Corporate Marketing	6	5	0	2	2
Project Cost Estimation and Cost Management	66	19	8	11	5
Quality Management	44	17	7	9	7
Procurement and Tendering Procedures	46	15	6	3	3
Contract Conditions	23	7	5	2	1
Joint Ventures / Partnering (PPP)	6	1	3	1	0
Health and Safety Management	60	11	4	6	5
Handing Over / Guarantee Period	8	0	1	4	0
Environmental Management	14	9	5	2	1
Other	5	2	0	1	0

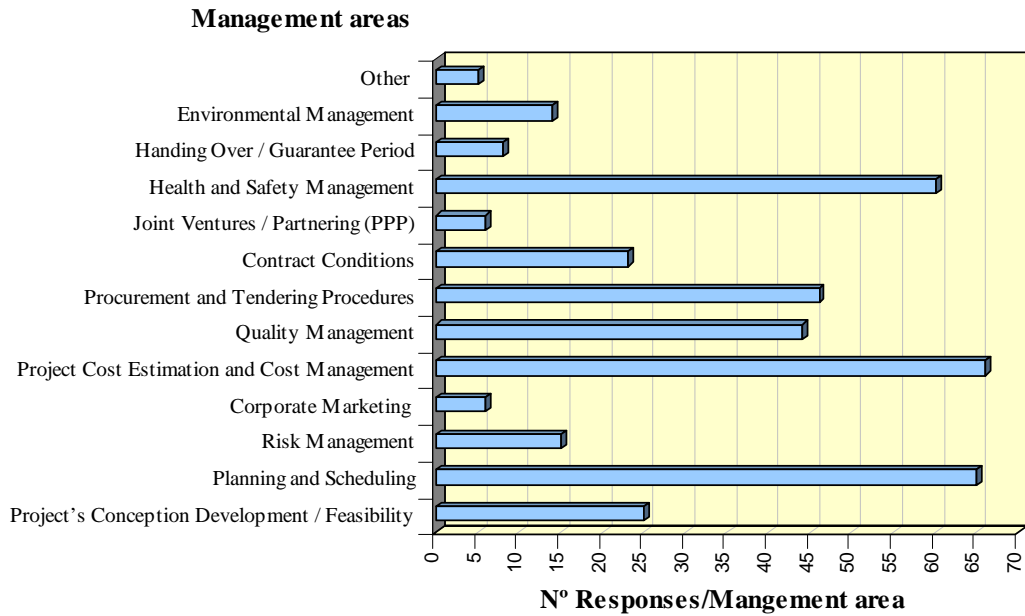


Figure 12: Relevant management areas selected by *Contractors*

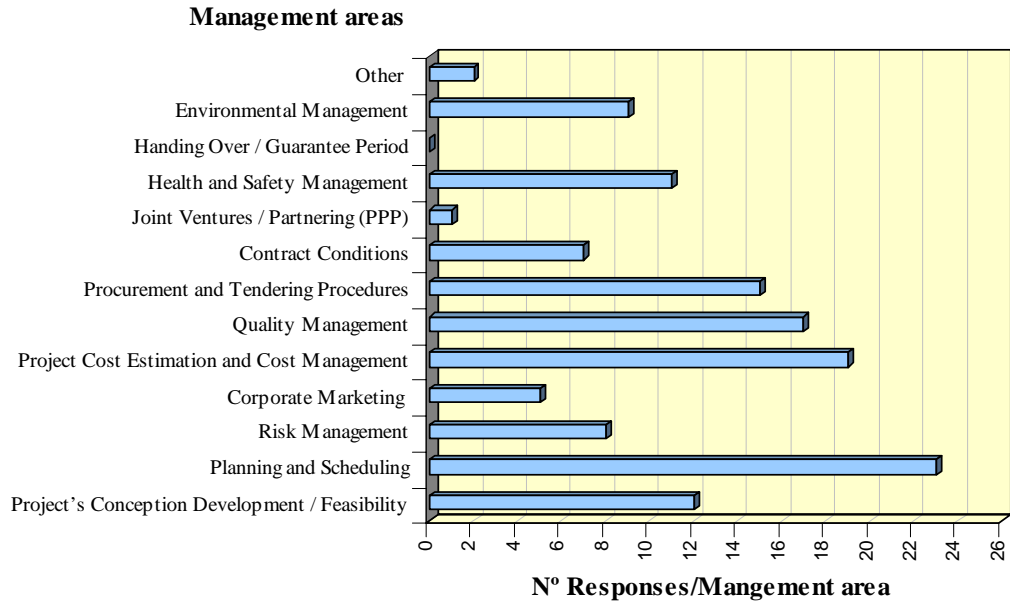


Figure 13: Relevant management areas selected by *Consultants*

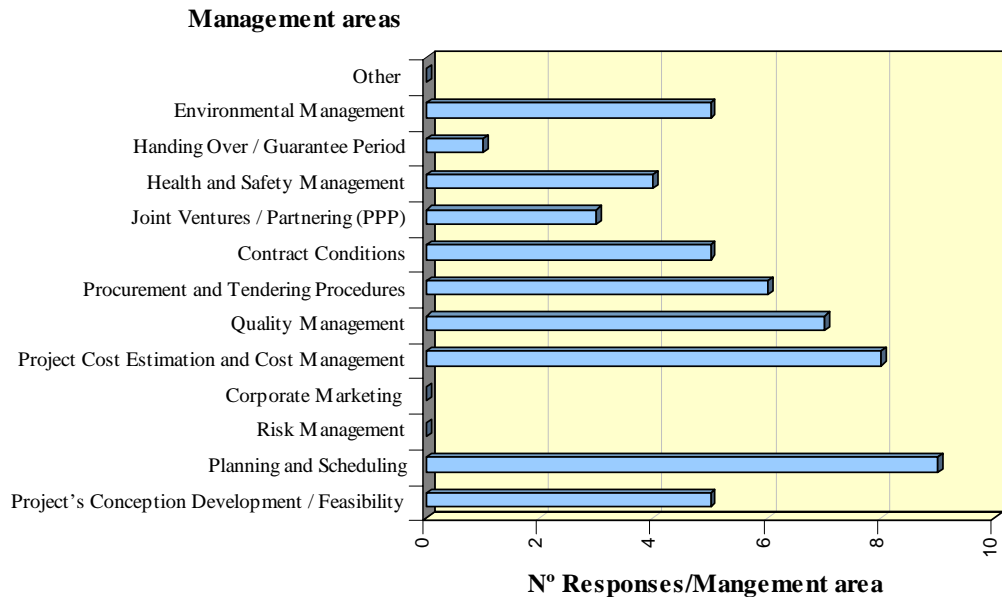


Figure 14: Relevant management areas selected by *Public Agencies*

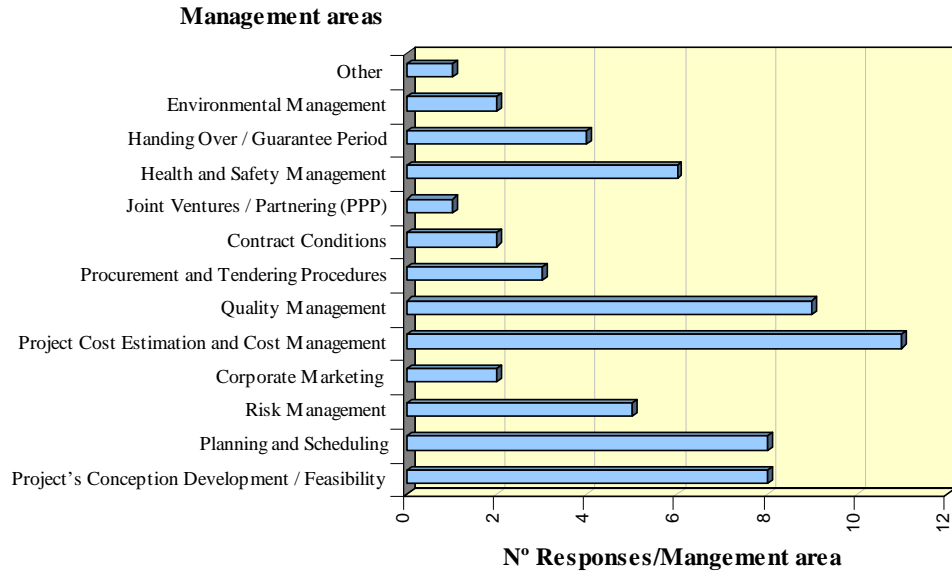


Figure 15: Relevant management areas selected by *Private Investors*

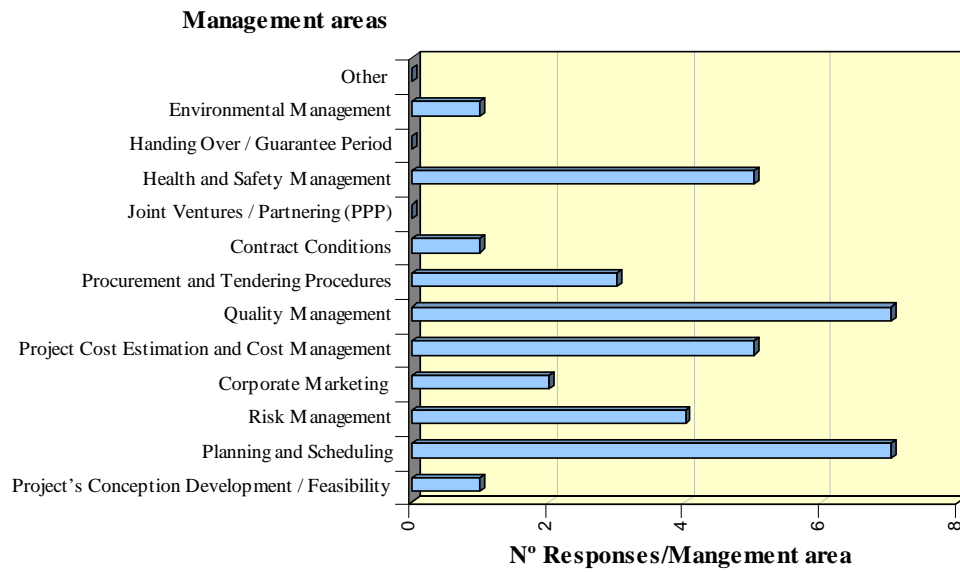


Figure 16: Relevant management areas selected by *Others*

Table 12: Most relevant management areas for each type of organisation - Spain

Management areas	Contractors	Consultant	Public Agency	Private Investor	Other
Health and Safety Management	●				●
Project Cost Estimation and Cost Management	●	●	●	●	●
Quality Management		●	●	●	●
Procurement and Tendering Procedures	●	●	●		
Planning and Scheduling	●	●	●	●	●
Project's Conception Development / Feasibility				●	

2.4.4 Lithuania

Table 13: Number of responses/Organisation type - Lithuania

Management areas	Contractors	Consultants / Project Managers	Governmental Organisation / Local Authorities	Private Investor / Client / Developer	Professional Associations related to Construction	Other
Project's Conception Development / Feasibility	11	5	1	2	3	0
Planning and Scheduling	22	5	0	1	2	0
Risk Management	16	3	0	1	1	1
Corporate Marketing	9	4	0	0	1	1
Project Cost Estimation and Cost Management	18	6	1	2	3	1
Quality Management	19	6	0	2	0	1
Procurement and Tendering Procedures	14	3	0	0	1	0
Contract Conditions	18	3	1	2	1	1
Joint Ventures / Partnering (PPP)	4	1	0	0	1	0
Health and Safety Management	7	1	0	0	0	0
Handing Over / Guarantee Period	8	2	0	1	1	0
Environmental Management	9	1	1	0	0	0
Other	1	0	1	1	0	0

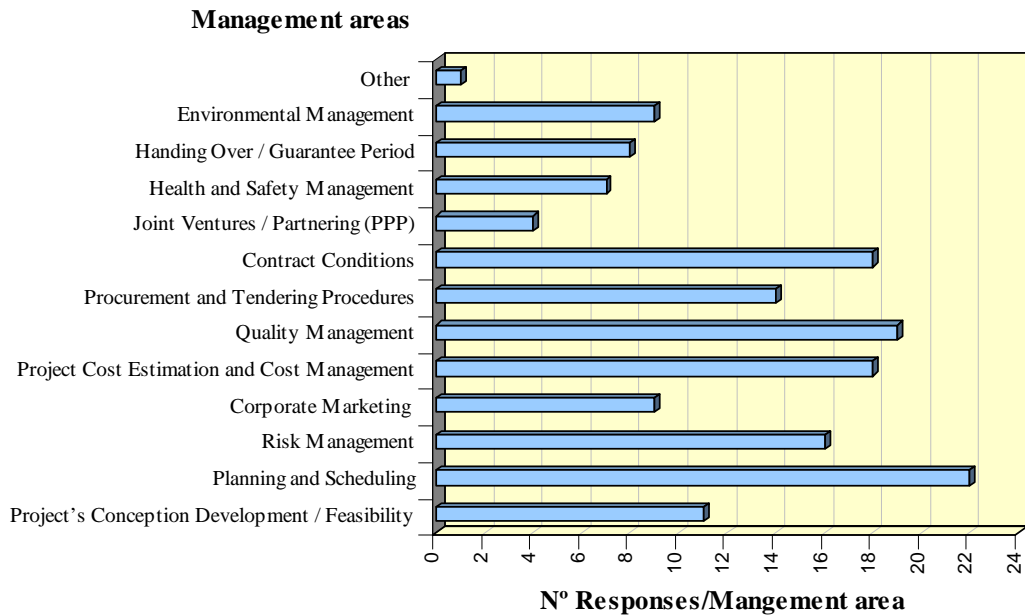


Figure 17: Relevant management areas selected by *Contractors*

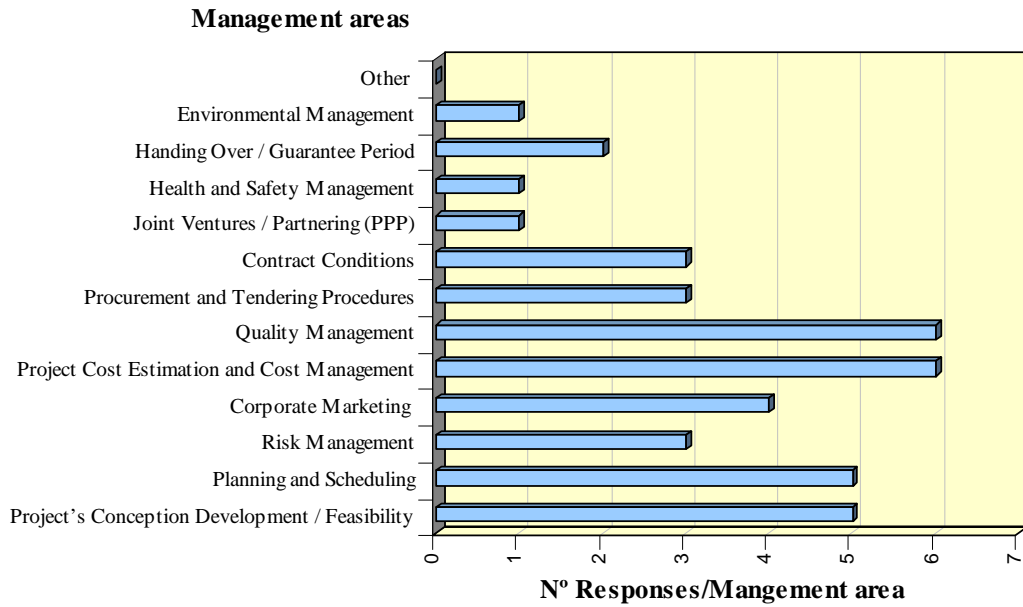


Figure 18: Relevant management areas selected by *Consultants / Project managers*

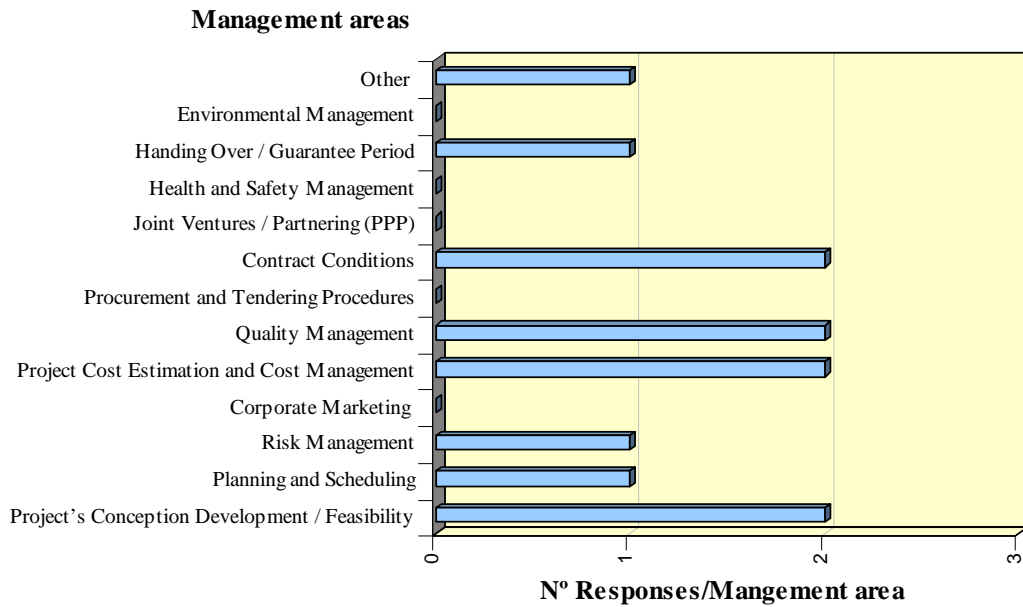


Figure 19: Relevant management areas selected by *Private Investor / Client / Developer*

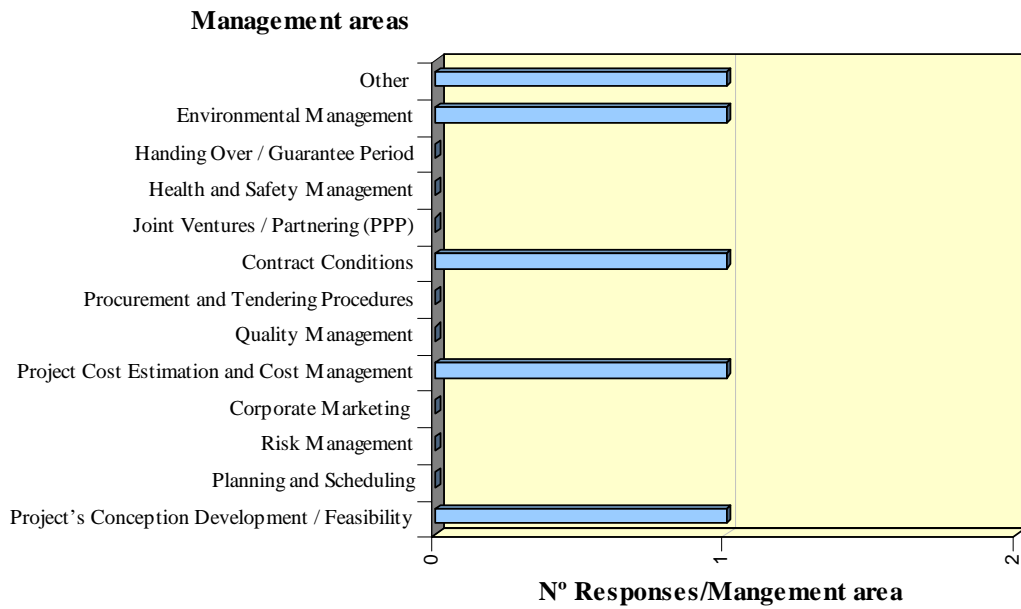


Figure 20: Relevant management areas selected by *Governmental Organisation / Local Authorities*

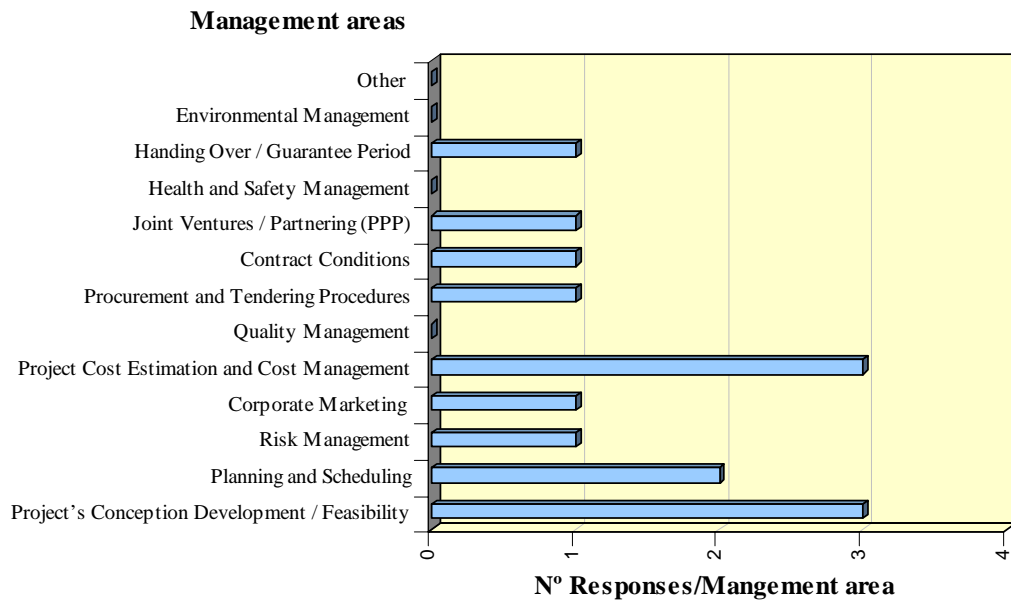


Figure 21: Relevant management areas selected by *Professional Associations related to Construction*

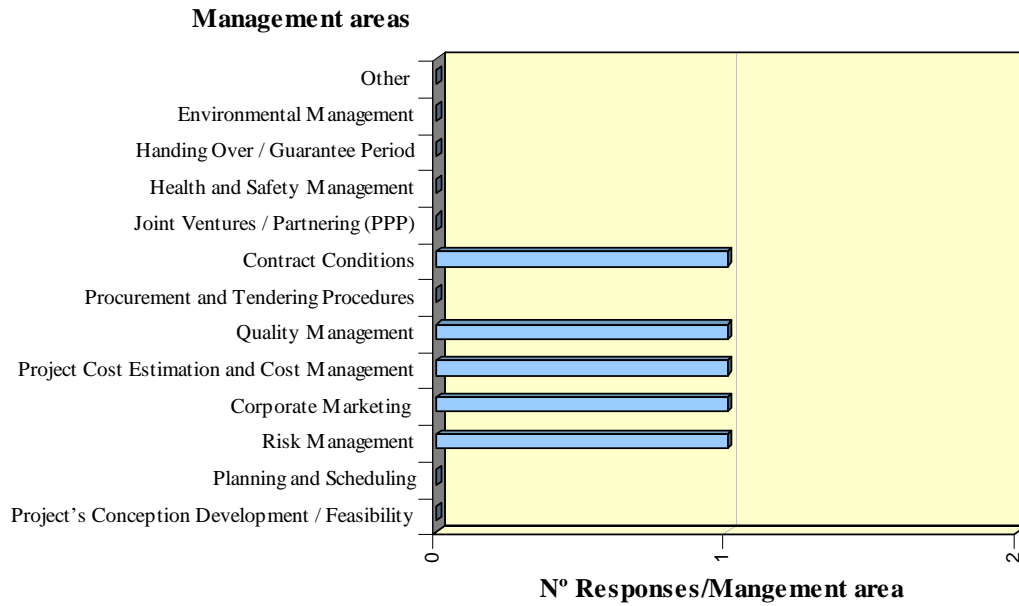


Figure 22: Relevant management areas selected by *Others*

Table 14: Most relevant management areas for each type of organization - Lithuania

Management areas	Contractors	Consultants / Project Managers	Private Investor / Client / Developer	Governmental Organisation / Local Authorities	Professional Associations related to Construction	Other
Project's Conception Development / Feasibility		●	●	●	●	
Planning and Scheduling	●	●			●	
Risk Management						●
Project Cost Estimation and Cost Management	●	●	●	●	●	●
Quality Management	●	●	●			●
Contract Conditions	●		●	●		●

2.4.5 Aggregate Results

Table 15: Summary table of the opinions on the most relevant management areas, selected by each type of organization, in the four countries

Management areas	Contractors		Consultants / Project Managers		Governmental Organisation / Local Authorities		Private Investor / Client / Developer		Professional Associations related to Construction		Other		TOTAL	
Project's Conception Development / Feasibility	58	7,32%	32	10,53%	14	10,53%	17	11,49%	4	21,05%	5	6,58%	130	8,83%
Planning and Scheduling	121	15,28%	38	12,50%	16	12,03%	18	12,16%	2	10,53%	12	15,79%	207	14,06%
Risk Management	54	6,82%	22	7,24%	8	6,02%	9	6,08%	1	5,26%	5	6,58%	99	6,73%
Corporate Marketing	29	3,66%	16	5,26%	2	1,50%	5	3,38%	1	5,26%	3	3,95%	56	3,80%
Project Cost Estimation and Cost Management	113	14,27%	40	13,16%	20	15,04%	23	15,54%	3	15,79%	12	15,79%	211	14,33%
Quality Management	87	10,98%	37	12,17%	12	9,02%	16	10,81%	1	5,26%	10	13,16%	163	11,07%
Procurement and Tendering Procedures	80	10,10%	31	10,20%	14	10,53%	11	7,43%	2	10,53%	8	10,53%	146	9,92%
Contract Conditions	60	7,58%	23	7,57%	14	10,53%	10	6,76%	1	5,26%	8	10,53%	116	7,88%
Joint Ventures / Partnering (PPP)	26	3,28%	8	2,63%	9	6,77%	6	4,05%	1	5,26%	0	0,00%	50	3,40%
Health and Safety Management	84	10,61%	19	6,25%	9	6,77%	11	7,43%	1	5,26%	7	9,21%	131	8,90%
Handing Over / Guarantee Period	36	4,55%	13	4,28%	6	4,51%	13	8,78%	2	10,53%	2	2,63%	72	4,89%
Environmental Management	38	4,80%	22	7,24%	7	5,26%	5	3,38%	0	0,00%	2	2,63%	74	5,03%
Other	6	0,76%	3	0,99%	2	1,50%	4	2,70%	0	0,00%	2	2,63%	17	1,15%
Total	792	100%	304	100%	133	100%	148	100%	19	100%	76	100%	1472	100%

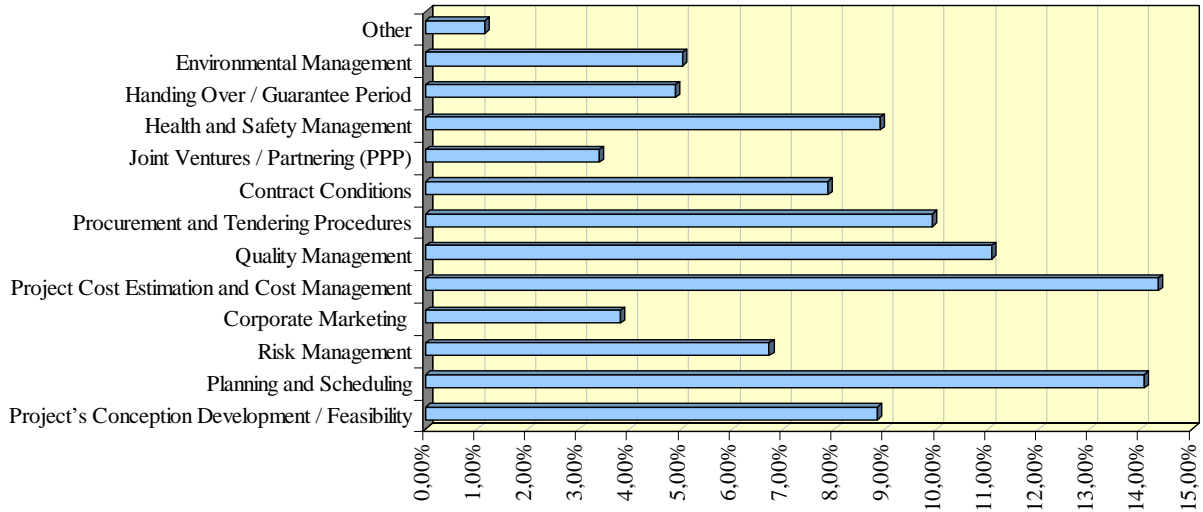


Figure 23: Relevant management areas in the construction industry in the four countries

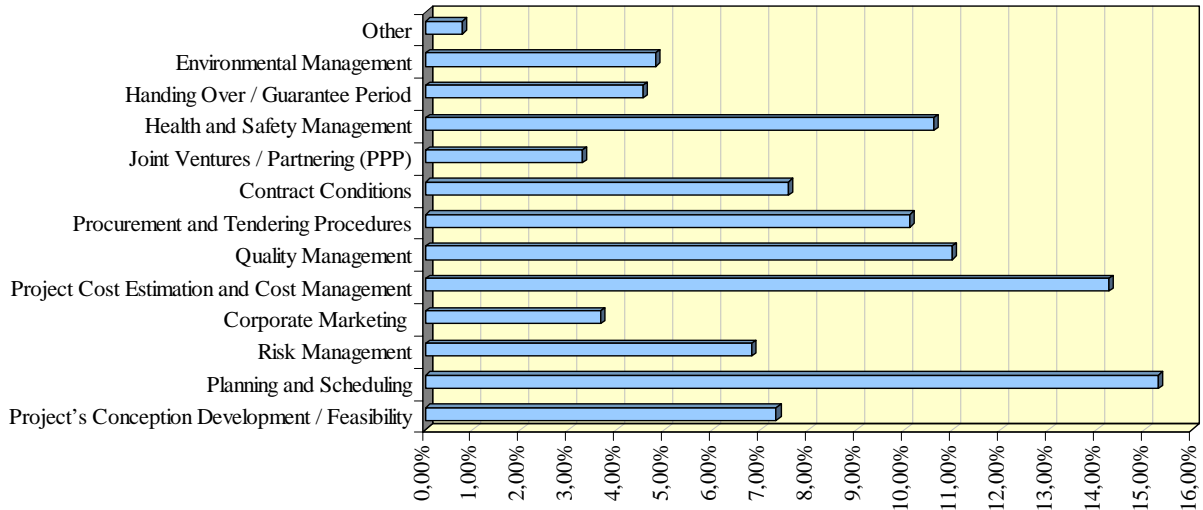


Figure 24: Relevant management areas selected by *Contractors*

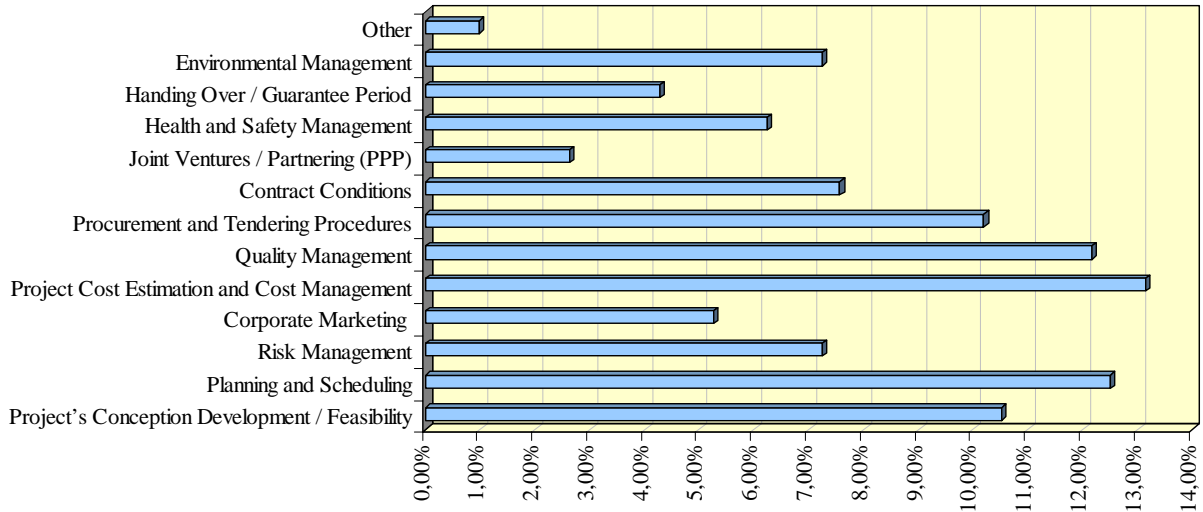


Figure 25: Relevant management areas selected by *Consultant / Project Manager*

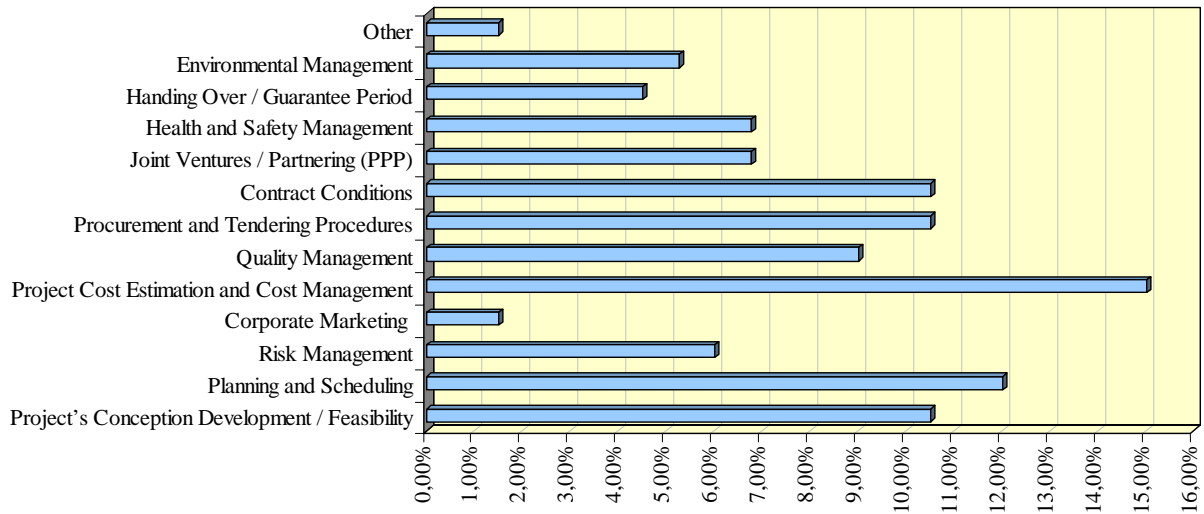


Figure 26: Relevant management areas selected by *Governmental Organisation / Local Authorities*

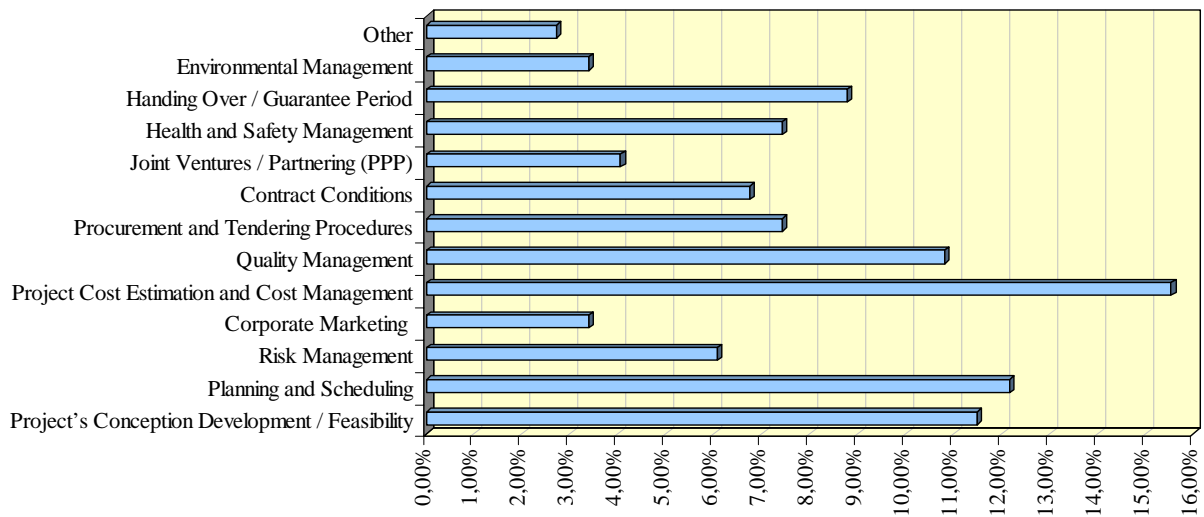


Figure 27: Relevant management areas selected by *Private Investor / Client / Developer*

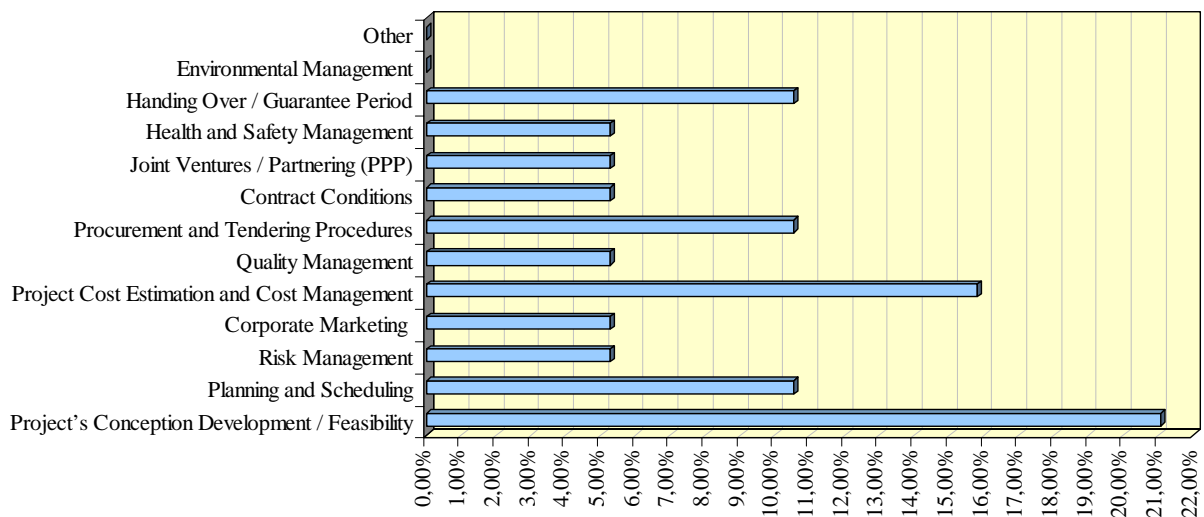


Figure 28: Relevant management areas selected by *Professional Associations related to Construction*

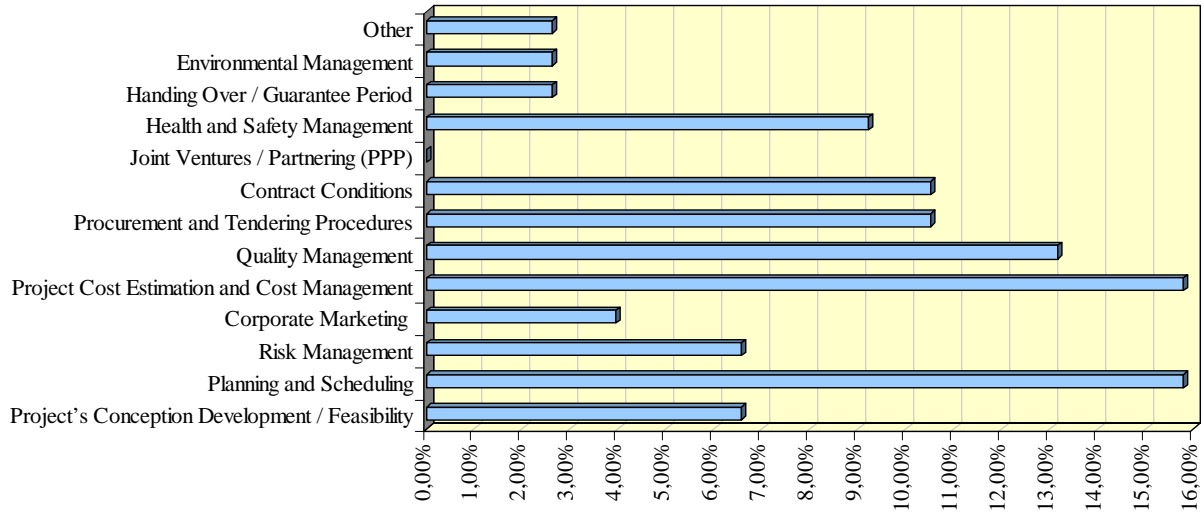


Figure 29: Relevant management areas selected by *Other*

Table 16: Summary table of the most relevant management areas for each type of organization in the four countries

Management areas	Contractors	Consultants / Project Managers	Governmental Organisation / Local Authorities	Private Investor / Client / Developer	Professional Associations related to Construction	Other
Project's Conception Development / Feasibility		●	●	●	●	
Planning and Scheduling	●	●	●	●	●	●
Project Cost Estimation and Cost Management	●	●	●	●	●	●
Quality Management	●	●		●		●
Procurement and Tendering Procedures	●	●	●		●	●
Contract Conditions			●			●
Health and Safety Management	●					
Handing Over / Guarantee Period				●	●	

2.5 Most Relevant Management Areas Selected Within The Construction

The graphs below illustrate the opinions on the most relevant management areas within the construction industry of each country.

2.5.1 Portugal

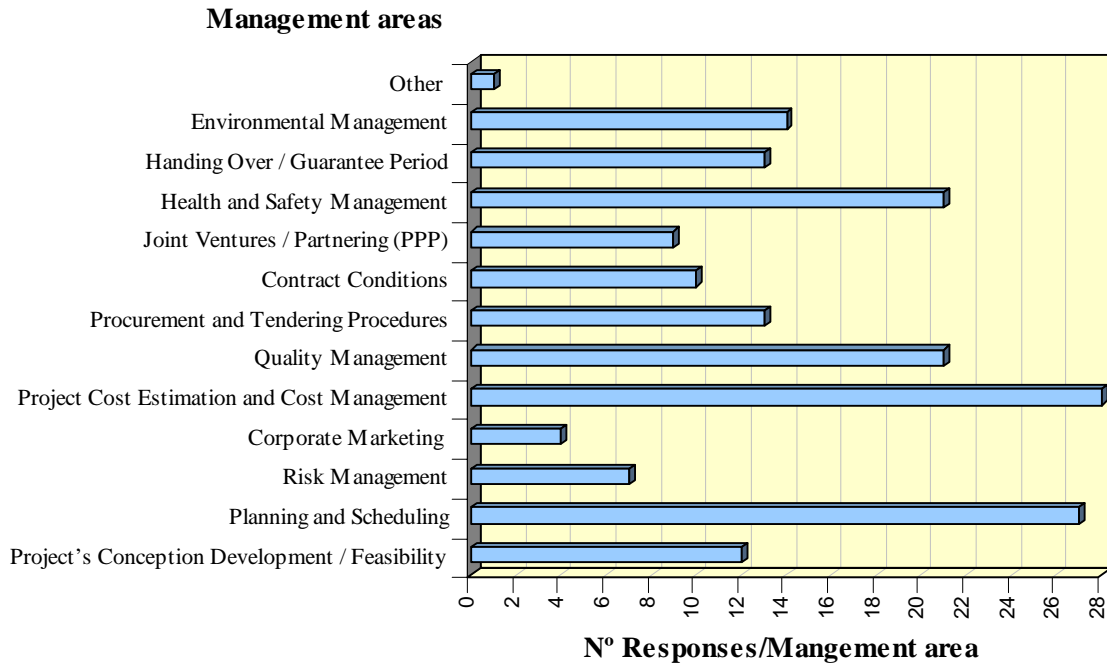


Figure 30: Most relevant management areas elected by Portuguese organisations

Most relevant management areas selected by Portuguese organisations:

- Project Cost Estimation and Cost Management;
- Planning and scheduling;
- Health & Safety Management;
- Quality Management;

2.5.2 Poland

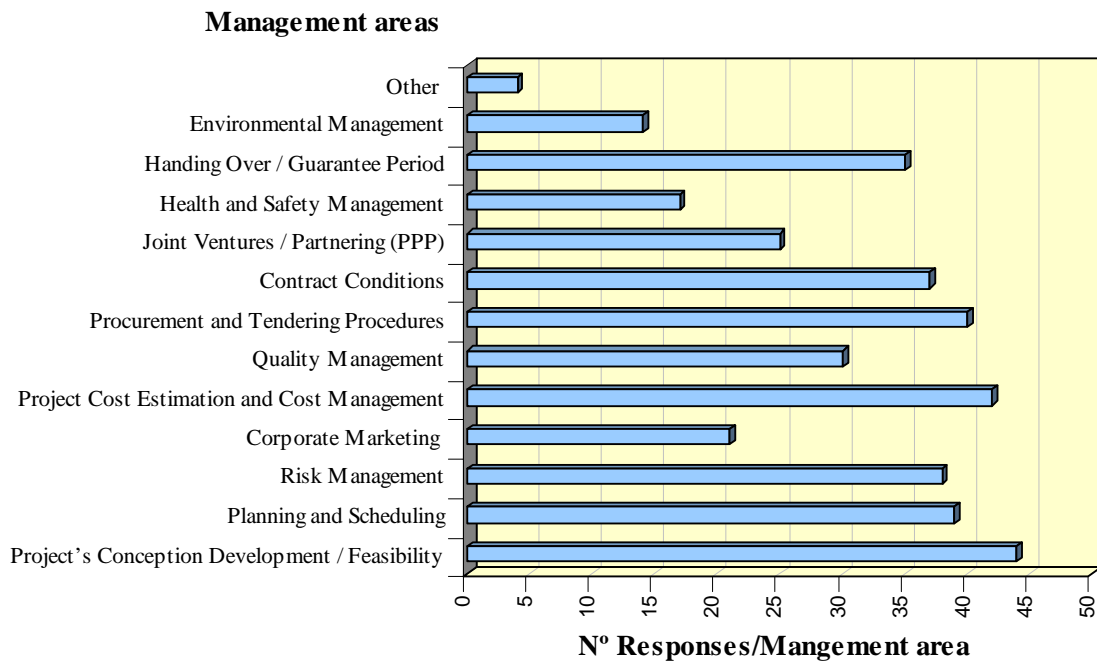


Figure 31: Most relevant management areas selected by Polish organisations

Most relevant management areas selected by Polish organisations:

- Project's Conception Development / Feasibility;
- Planning and Scheduling;
- Risk Management;
- Project Cost Estimation and Cost Management;
- Procurement and Tendering Procedures;
- Contract Conditions.

2.5.3 Spain

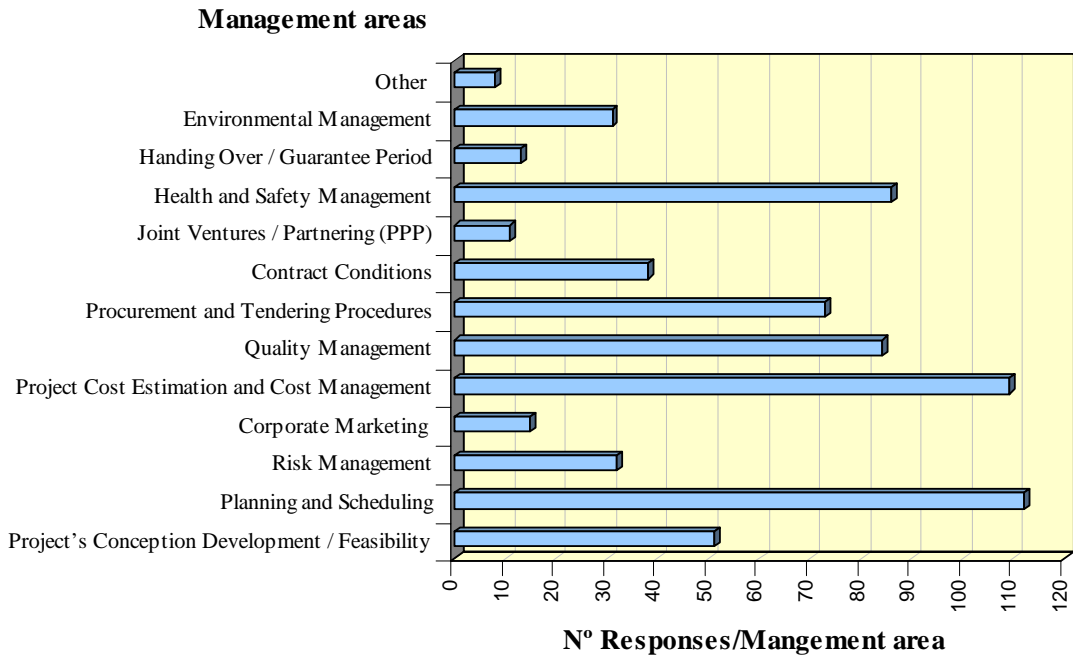


Figure 32: Most relevant management areas selected by Spanish organisations

Most relevant management areas selected by Spanish organisations:

- Planning and scheduling;
- Project Cost Estimation and Cost Management;
- Health & Safety Management;
- Quality Management;
- Procurement and Tendering Procedures.

2.5.4 Lithuania

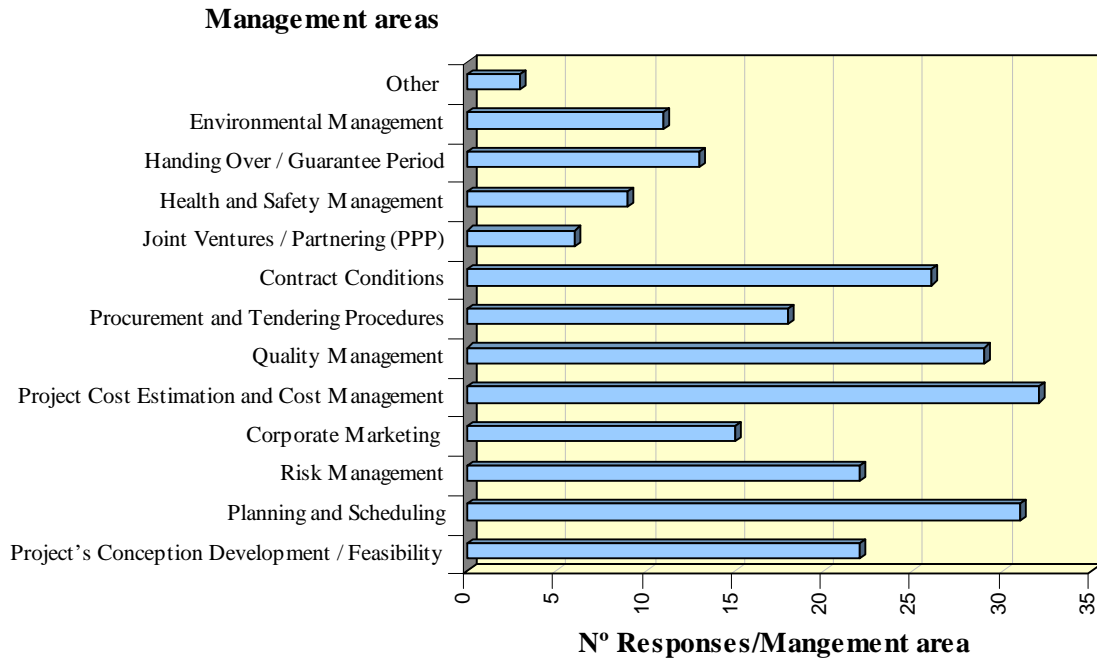


Figure 33: Most relevant management areas selected by Lithuanian organisations

Most relevant management areas selected by Lithuanian organisations:

- Project's Conception Development / Feasibility;
- Planning and Scheduling;
- Risk Management;
- Project Cost Estimation and Cost Management;
- Quality Management;
- Procurement and Tendering Procedures;
- Contract Conditions.

2.5.5 Aggregate Results

Table 17: Summary table on the most relevant management areas selected in each country

Management areas	Most relevant management areas			
	Portugal	Spain	Poland	Lithuania
Planning and Scheduling	●	●	●	●
Project Cost Estimation and Cost Management	●	●	●	●
Quality Management	●	●		●
Procurement and Tendering Procedures		●	●	●
Health & Safety Management	●	●		
Project's Conception Development / Feasibility			●	●
Risk Management			●	●
Contract Conditions			●	●
Environmental Management	●			

2.6 Training Courses Provided by Organisations in Each Country

Information on courses already provided by the organisations in the area of management in construction in the last three years, mainly: type of course, number of participants and subject, is depicted below for each country.

2.6.1 Portugal

The responses obtained from the Portuguese industry show that 67% of the organizations have provided training courses in the area of management in construction for their employees within the last 3 years (33% have not), wherein 43% provided external courses, 4% internal courses and 17% both internal and external courses (see Figure 34 and 35).

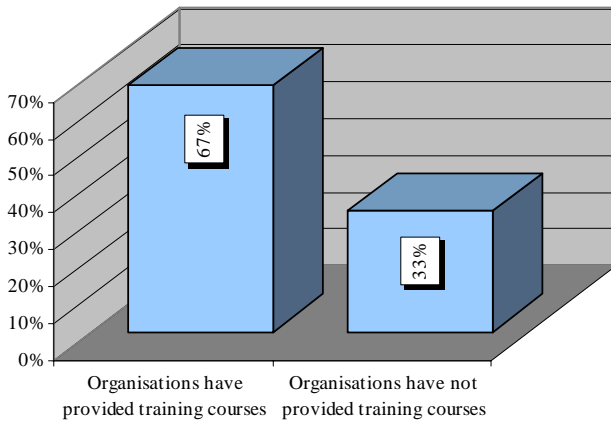


Figure 34: Percentage of organisations which have provided training courses in Portugal

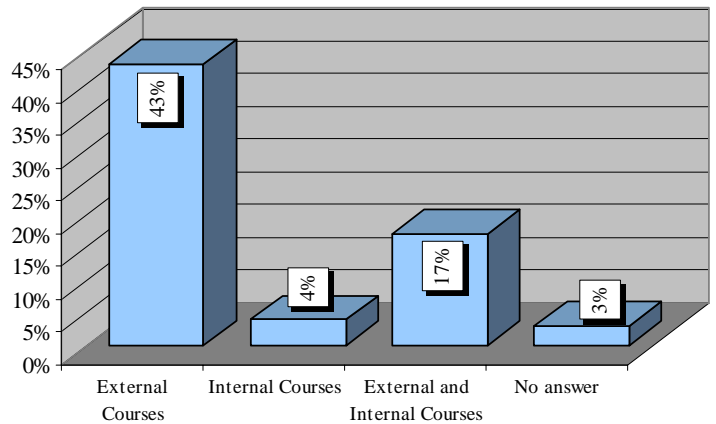


Figure 35: Type of training courses provided by organisations in Portugal

Training courses usually undertaken include:

- Project Management
- Cost Management
- Planning and Scheduling
- Contract Management
- Quality Management
- Health and Safety Management
- Environmental Management

2.6.2 Poland

17% of the organisations have provided some type of training courses in the area of management in construction for their employees within the last three years, against 83% that have not provided any training (Figure 36). The type of training provided is illustrated in Figure 37.

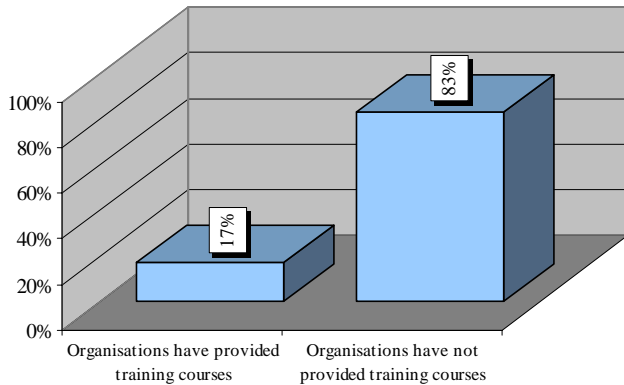


Figure 36: Percentage of organisations which have provided training courses in Poland

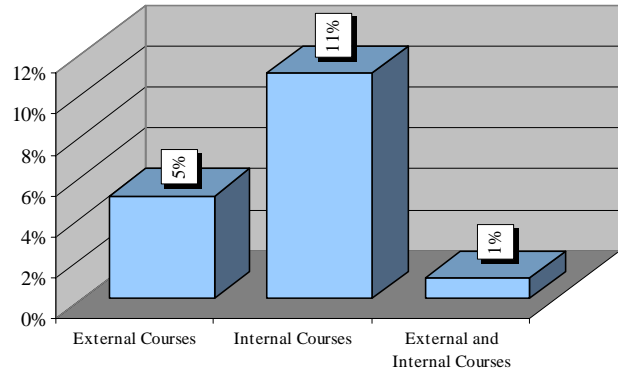


Figure 37: Type of training courses provided by organisations in Poland

Training courses usually undertaken and illustrated in Figure 38 include:

- FIDIC Procedures,
- Tendering Procedures (PZP),
- Project Cost Estimation,
- Building Law,
- Management in Construction,
- Construction Technology,
- Quality Management,
- Health and Safety Management (BHP),
- Cohesion Funds.

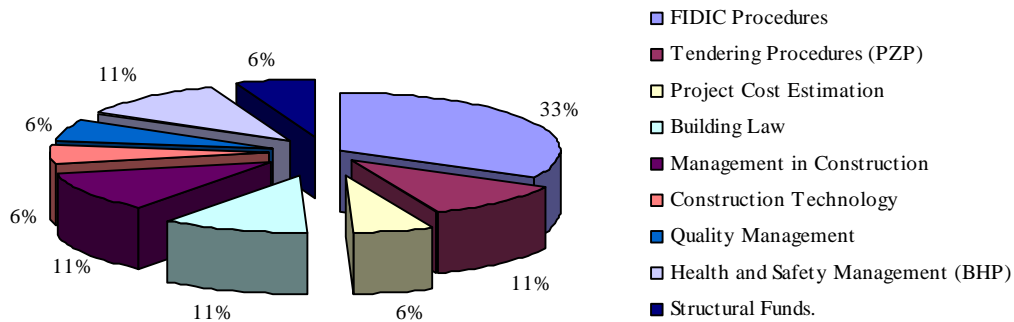


Figure 38: Training courses provided by responding organisations in Poland

2.6.3 Spain

67% of the organisations have provided some type of training courses in the area of management in construction for their employees within the last three years against 33% which have not provided any training. The type of training provided by the Spanish organisations is illustrated in Figure 40.

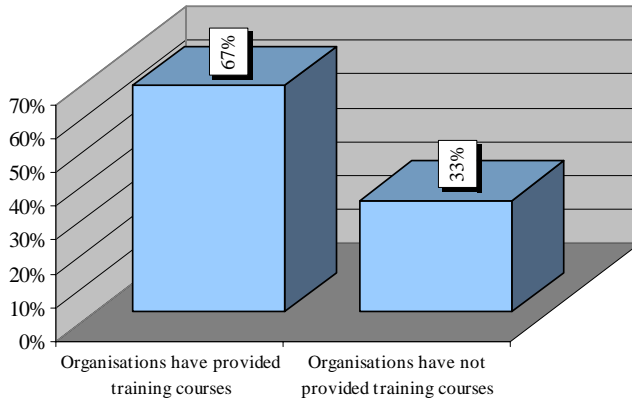


Figure 39: Percentage of organisations which have provided training courses in Spain

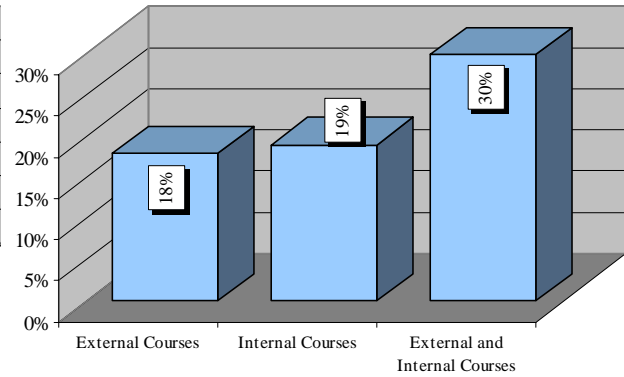


Figure 40: Type of training courses provided by organisations in Spain

Training courses usually undertaken include (Figure 41):

- Health and Safety Management.
- Quality Management.
- Environmental Management.
- Planning and Scheduling.
- Project Cost Estimation and Cost Management.

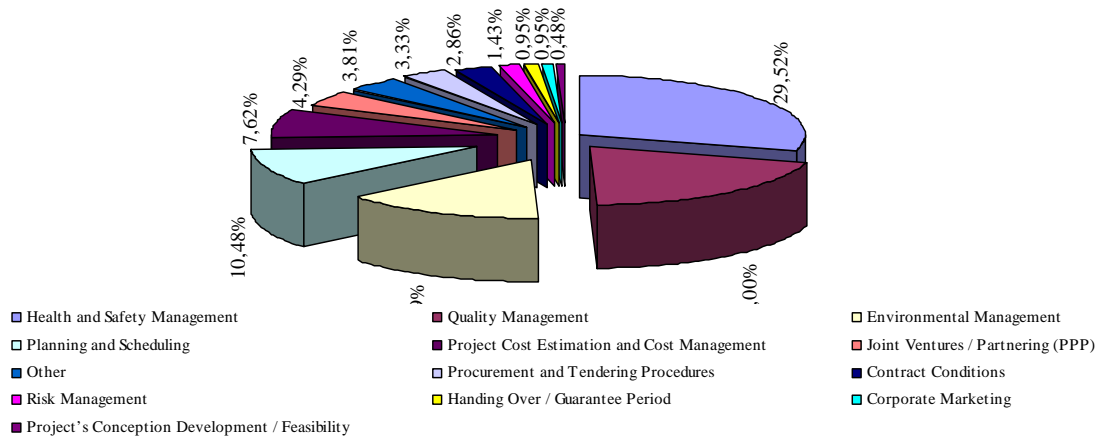


Figure 41: Type of training course provided by responding organizations in Spain

2.6.4 Lithuania

Approximately 60% of the organizations have provided some type of training courses in the area of management in construction for their employees within the last three years. About 26% of the training courses provided by the organizations were external, 11% were internal courses and 23% have provided both types of courses (Figure 43).

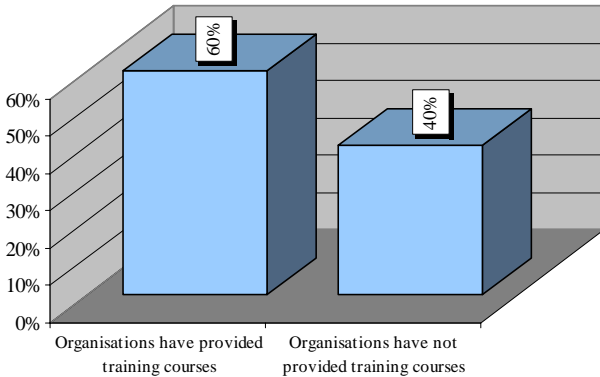


Figure 42: Percentage of organisations which have provided training courses in Lithuania

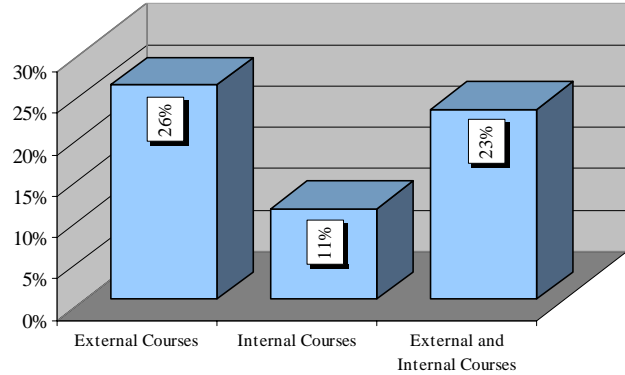


Figure 43: Type of training courses provided by organisations in Lithuania

Training courses usually undertaken include (Figure 44):

- Construction technology;
- Quality Management;
- Health and Safety Management;
- Building Structures;
- Construction Project Management;
- Risk Management;
- Environmental Management;
- IT application;
- Cost Management, Planning and Scheduling;
- Building Law, legislation and contract management.

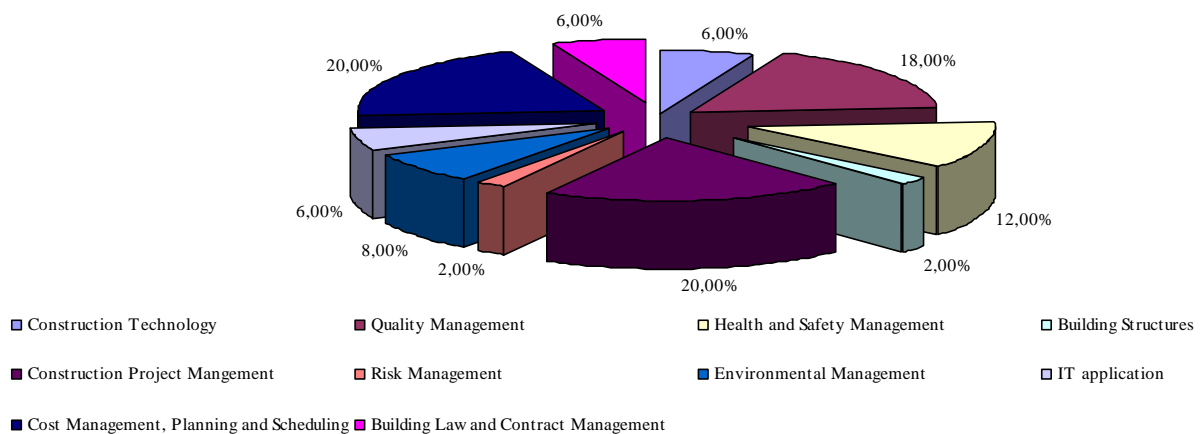


Figure 44: Type of training course provided by responding organizations in Lithuania

2.6.5 Summary

The comparisons between the four countries of the percentage of organisations which have provided training courses for their employees, as well as the type of course provided, are illustrated below.

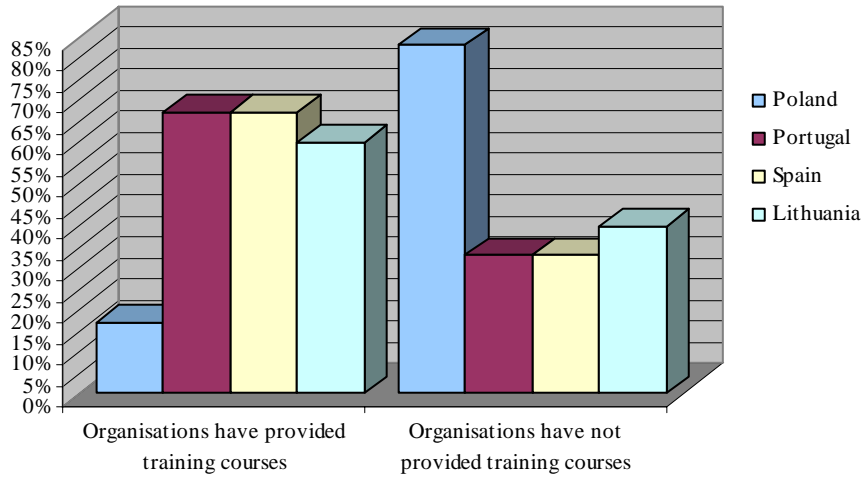


Figure 45: Comparison of percentage of organisations which have provided training courses

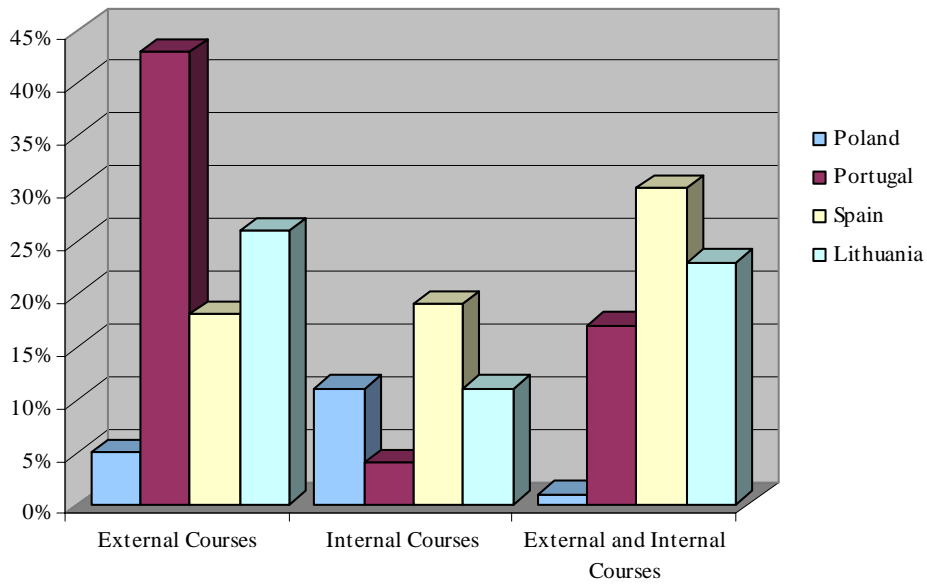


Figure 46: Comparison of type of training courses provided by organisations

2.7 Interest in Future Courses

The interest in future training courses in management in construction is depicted below.

2.7.1 Portugal

80% of the organisations are interested in future training courses in management in construction for their employees and mostly prefer external courses (50%) in comparison to internal courses (27%) and distance learning (23%). These aspects are shown in the figures below.

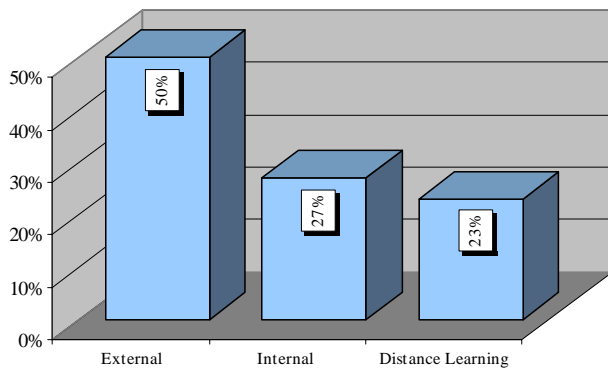


Figure 47: Preferred type of courses for future training selected in Portugal

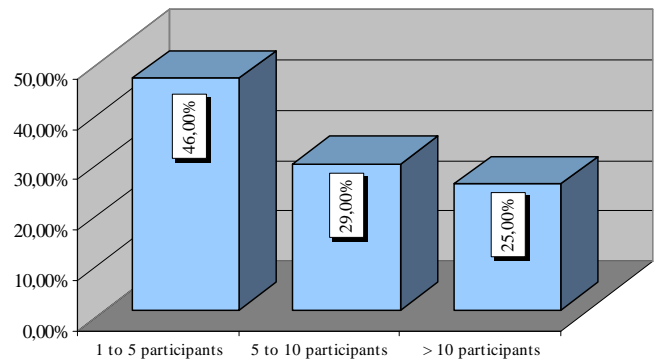


Figure 48: Estimate number of future participants

2.7.2 Poland

99% of the firms which have filled the questionnaire are interested in future training courses in construction management for their employees. Preferred courses include: external courses (77%), internal courses (19%) and distant learning (4%). Figure 51 illustrates this comparison and Figure 52 the estimate number of future participants from each organisation.

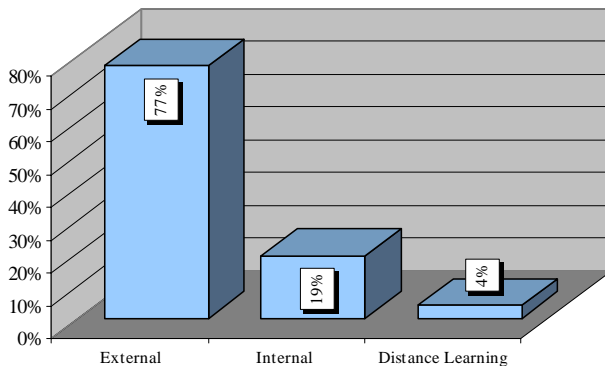


Figure 51: Preferred type of courses for future training selected in Poland

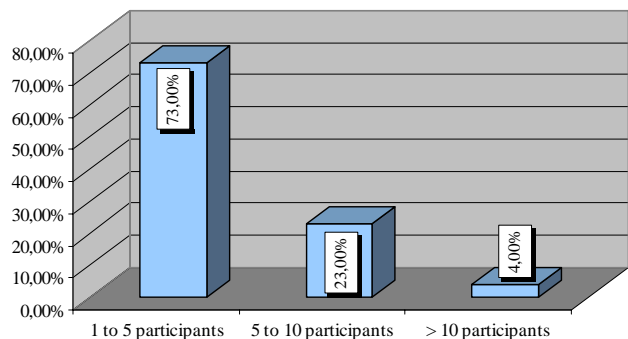


Figure 52: Estimate number of future participants

2.7.3 Spain

92% of the organisations are interested in future training courses in construction management for their employees and mostly prefer distance learning courses (38%) and external courses (35%) for their employees, to internal courses (27%). Figure 53 illustrates this comparison and Figure 54 the estimate number of future participants from each organisation.

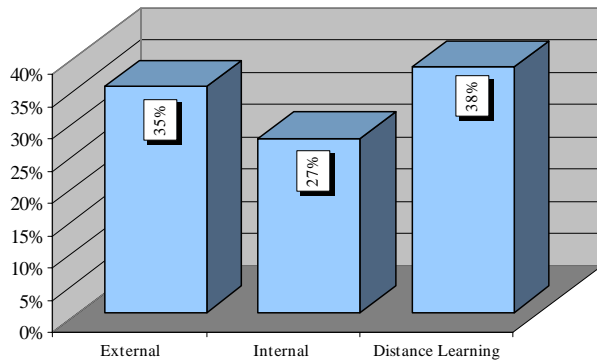


Figure 53: Preferred type of courses for future training selected in Spain

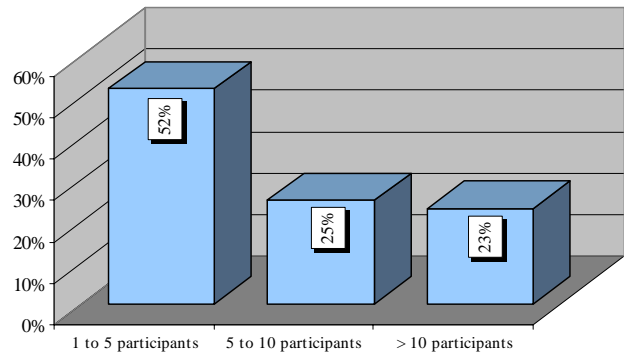


Figure 54: Estimate number of future participants

2.7.4 Lithuania

Approximately 97% of organizations that filled the questionnaire are interested in future training courses in construction management for their employees and mostly prefer external courses (53%). Internal courses rated 35% and distant learning rated 12% (Figure 55).

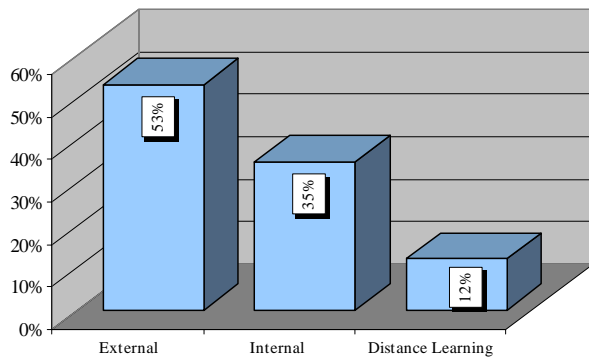


Figure 55: Preferred type of courses for future training selected in Lithuania

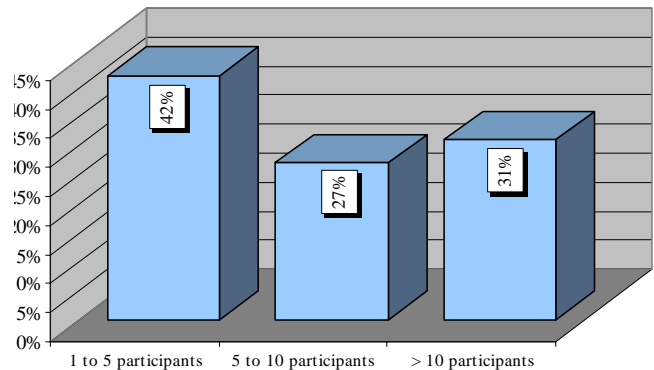


Figure 56: Estimate number of future participants

2.7.5 Summary

The comparisons between the four countries of preferred type of courses for future training and estimate number of future participants are illustrated in Figures 57 and 58.

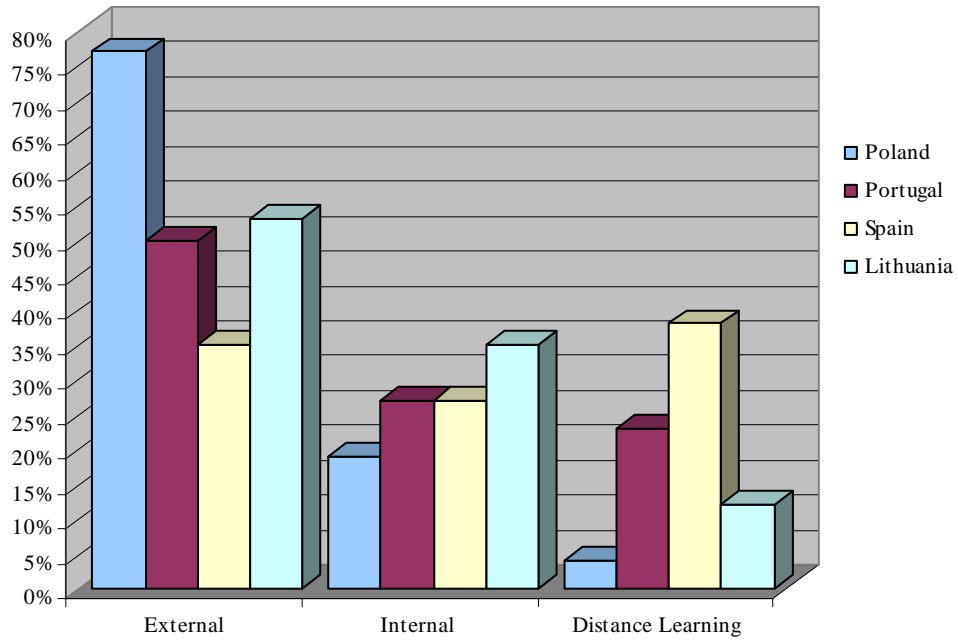


Figure 57: Comparison of preferred type of courses for future training

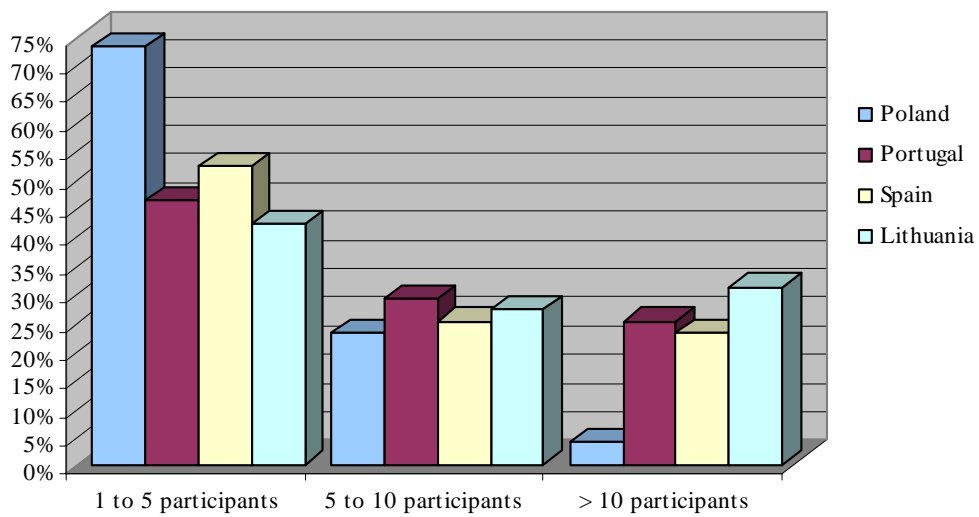


Figure 58: Comparison of estimate number of future participants

3. Conclusions

The training needs of Portuguese, Polish, Spanish and Lithuanian construction engineers and managers were assessed through questionnaires sent to the various organisations that operate within the construction industry.

According to the results of table 15 the most relevant management areas selected in the inquiry (shadow rows in the table) were:

- Project Cost Estimation and Cost Management;
- Planning and Scheduling;
- Quality Management;
- Procurement and Tendering Procedures;

Consequently, the creation of a series of future CPD (Continuing Professional Development) training courses in management of infrastructure construction projects is suggested for these areas.

Annex 1: Questionnaire from Portugal

Leonardo da Vinci project number: **PL/04/B/F/PP-174417** titled: Recognition of needs and creation of the professional training in the area of preparation and management of infrastructure construction projects financed by the European Union

**QUESTIONNAIRE:
“MANAGEMENT COURSES OF INFRASTRUCTURE PROJECTS IN CONSTRUCTION”**

A. TYPE OF ORGANISATION:

Id.	Type	Number of Employees				Number of Engineers
		<5	5-50	50-250	>250	
1	Contractor					
2	Consultant / Project Manager					
3	Governmental Organisation/Local Authorities					
4	Private Investor / Client / Developer					
5	Professional Associations related to Construction					
6	Other (please state):					

B. RELEVANT MANAGEMENT AREAS IN CONSTRUCTION

(please select at least 5 relevant areas)

Id.	Most relevant Management areas
1	Project’s Conception Development / Feasibility
2	Planning and Scheduling
3	Risk Management
4	Corporate Marketing
5	Project Cost Estimation and Cost Management
6	Quality Management
7	Procurement and Tendering Procedures
8	Contract Conditions
9	Joint Ventures / Partnering (PPP)
10	Health and Safety Management
11	Handing Over / Guarantee Period
12	Environmental Management
13	Other (please state):

C. HAVE YOU PROVIDED TRAINING COURSES IN THE AREA OF MANAGEMENT IN CONSTRUCTION FOR EMPLOYEES WITHIN THE LAST THREE YEARS? YES NO

If YES, please state the training area:

Type of Course	Number of participants from your organisation	Subject
Internal		
External		

D. ARE YOU INTERESTED IN TRAINING COURSES IN THE AREA OF MANAGEMENT IN CONSTRUCTION FOR EMPLOYEES? YES NO

D1. If YES please state the most relevant type of course: internal external distance learning method

D2. Estimate the number of participants from your organisation who would attend training courses in the various areas of management in construction:

1-5 5-10 >10

E. Do you wish to receive more information about the “Leonardo da Vinci” project? YES NO

If YES, please give detailed information below:

Name of the Organisation:
 Name of the person: Title:
 Phone: Fax: Email:
 Date:

Annex 2: Questionnaire from Poland

Leonardo da Vinci project number: PL/04/B/F/PP-174417 titled: Recognition of needs and creation of the professional training in the area of preparation and management of infrastructure construction projects financed by the European Union

QUESTIONNAIRE:

“MANAGEMENT COURSES OF INFRASTRUCTURE PROJECTS IN CONSTRUCTION”

A. TYPE OF ORGANISATION:

Id.	Type	Number of Employees				Number of Const Manag.	Number of Constr. Engineers
		<5	5-50	50-250	>250		
1	Contractor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2	Consultant / Project Manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3	Governmental Organisation /Local Authorities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4	Private Investor / Client / Developer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5	Professional Associations related to Construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6	Other (please state):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

B. THE MOST IMPORTANT MANAGEMENT DISCIPLINES IN CONSTRUCTION

(please select the most important 5 subjects)

Id.	Discipline	Write <input checked="" type="checkbox"/> if YES
1	Project's Conception Development / Feasibility	<input type="checkbox"/>
2	Planning and Scheduling	<input type="checkbox"/>
3	Risk Management	<input type="checkbox"/>
4	Corporate Marketing	<input type="checkbox"/>
5	Project Cost Estimation and Cost Management	<input type="checkbox"/>
6	Quality Management	<input type="checkbox"/>
7	Procurement and Tendering Procedures	<input type="checkbox"/>
8	Contract Conditions	<input type="checkbox"/>
9	Joint Ventures / Partnering (PPP)	<input type="checkbox"/>
10	Health and Safety Management	<input type="checkbox"/>
11	Handing Over / Guarantee Period	<input type="checkbox"/>
12	Environmental Management	<input type="checkbox"/>
13	Other (please state):	<input type="checkbox"/>

C. HAVE YOU PROVIDED TRAINING COURSES IN THE AREA OF MANAGEMENT IN CONSTRUCTION FOR EMPLOYEES WITHIN THE LAST THREE YEARS? YES NO

If YES, please state the training area:

Type of the Course	Number of participants from your organisation	SUBJECT
Internal		
External		

D. ARE YOU INTERESTED IN TRAINING COURSES IN THE AREA OF MANAGEMENT IN CONSTRUCTION FOR EMPLOYEES IN NEAR FUTURE? YES NO

D1. If YES please state the most relevant type of the course:

internal external distance learning method

D2. Estimate the number of future participants from your organisation who would attend training courses in areas of management in construction:

1-5 5-10 >10

E. Do you wish to receive more information about the Leonardo da Vinci project?

YES NO

Email:

Date:

Annex 3: Questionnaire from Spain

“Professional training in the area of management of infrastructure construction projects”	SEND QUESTIONNAIRE BY FAX: 963.877.569 to the attention of Eugenio Pellicer
--	---

A. TYPE OF ORGANISATION

Type	Number of employees				Number of technicians (engineers and architects)	Number of technician in management roles
	<5	5-50	51-250	>250		
CONSTRUCTION COMPANY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
CONSULTING COMPANY	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
PUBLIC AGENCY (GOVERNMENTAL, REGIONAL AND LOCAL)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
PRIVATE INVESTOR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
OTHER COMPANIES RELATED TO CONSTRUCTION INDUSTRY (QUALITY CONTROL LABORATORIES, SUPLIERS,...)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
OTHER (ESPECIFY):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

B. SPECIALIZATION OF THE COMPANY (please, select maximum 3)

ROADS <input type="checkbox"/>	BUILDING <input type="checkbox"/>
HYDRAULIC WORKS <input type="checkbox"/>	MARINE WORKS <input type="checkbox"/>
ENVIRONMENTAL ENGINEERING <input type="checkbox"/>	INDUSTRIAL FACILITIES <input type="checkbox"/>
URBAN DEVELOPMENT <input type="checkbox"/>	OTHER (ESPECIFY):

C. MANAGEMENT DISCIPLINES IN CONSTRUCTION INDUSTRY

C.1. Select in second column, the 5 most important subjects related to construction

C.2. Select in third column, the 5 most important needs in professional training

Disciplines	Most important subjects related to construction	Most important needs in professional training
PROJECT'S CONCEPTION DEVELOPMENT / FEASIBILITY	<input type="checkbox"/>	<input type="checkbox"/>
PLANNING AND SECHEDULLING	<input type="checkbox"/>	<input type="checkbox"/>
RISK MANAGEMENT	<input type="checkbox"/>	<input type="checkbox"/>
CORPORATE MARKETING	<input type="checkbox"/>	<input type="checkbox"/>
PROJECT COST ESTIMATING AND COST MANAGEMENT	<input type="checkbox"/>	<input type="checkbox"/>
QUALITY MANAGEMENT	<input type="checkbox"/>	<input type="checkbox"/>
PROCUREMENT AND TENDERING PROCEDURES	<input type="checkbox"/>	<input type="checkbox"/>
CONTRACT CONDITIONS	<input type="checkbox"/>	<input type="checkbox"/>
JOINT VENTURES / PARTNERING (PPP)	<input type="checkbox"/>	<input type="checkbox"/>
HEALTH AND SAFETY MANAGEMENT	<input type="checkbox"/>	<input type="checkbox"/>
HANDING OVER / GUARANTEE PERIOD	<input type="checkbox"/>	<input type="checkbox"/>
ENVIRONMENTAL MANAGEMENT	<input type="checkbox"/>	<input type="checkbox"/>
OTHER (ESPECIFY):	<input type="checkbox"/>	<input type="checkbox"/>

D. HAVE YOU PROVIDED TRAINING COURSES IN THE AREA OF MANAGEMENT IN CONSTRUCTION FOR EMPLOYEES WITHIN THE LAST THREE YEARS?

YES NO

If YES, please state the training area:

Type of course	Number of participants from your organisation	Subject
INTERNAL		
EXTERNAL		

E. ARE YOU INTERESTED IN TRAINING COURSES IN THE AREA OF MANAGEMENT IN CONSTRUCTION FOR EMPLOYEES IN NEAR FUTURE?

YES NO

E1. If YES, please state the most relevant type of course:

Internal External Distance learning method (“On line”; “Internet”,...)

E2. Estimate the number of future participants from your organisation who would attend training courses in areas of management in construction:

1-5 6-10 more than 10

Annex 4: Questionnaire from Lithuania

Leonardo da Vinci project number: PL/04/B/F/PP-174417 titled: Recognition of needs and creation of the professional training in the area of preparation and management of infrastructure construction projects financed by the European Union

**QUESTIONNAIRE:
“MANAGEMENT COURSES OF INFRASTRUCTURE PROJECTS IN CONSTRUCTION”**

A. TYPE OF ORGANISATION:

Id.	Type	Number of Employees				Number of Construction Managers	Number of Construction Engineers
		<5	5-50	50-250	>250		
1	Contractor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
2	Consultant / Project Manager	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
3	Governmental Organisation /Local Authorities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
4	Private Investor / Client / Developer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
5	Professional Associations related to Construction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
6	Other (please state):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

B. THE ORGANIZATION MAIN WORKING RANGE AND MOST IMPORTANT CONSTRUCTION MANAGEMENT DISCIPLINES

B1. Importance of construction management in implementation of infrastructure construction project ? %

B2. Please select 5 main working ranges and 5 the most important-problematic management subjects:

Id.	Working range	Write <input checked="" type="checkbox"/> if YES	Id.	Discipline	Write <input checked="" type="checkbox"/> if YES
1	Roads	<input type="checkbox"/>	1	Project’s Conception Development / Feasibility	<input type="checkbox"/>
2	Railroads	<input type="checkbox"/>	2	Planning and Scheduling	<input type="checkbox"/>
3	Airports and seaports	<input type="checkbox"/>	3	Risk Management	<input type="checkbox"/>
4	Bridges	<input type="checkbox"/>	4	Corporate Marketing	<input type="checkbox"/>
5	Viaduct	<input type="checkbox"/>	5	Project Cost Estimation and Cost Management	<input type="checkbox"/>
6	Hydrotechnical structures	<input type="checkbox"/>	6	Quality Management	<input type="checkbox"/>
7	Earth subgardes	<input type="checkbox"/>	7	Procurement and Tendering Procedures	<input type="checkbox"/>
8	Environmental cleaning and planting	<input type="checkbox"/>	8	Contract Conditions	<input type="checkbox"/>
9	Infrastructural and other buildings	<input type="checkbox"/>	9	Joint Ventures / Partnering (PPP)	<input type="checkbox"/>
10	Reconstruction of infrastructural structures	<input type="checkbox"/>	10	Health and Safety Management	<input type="checkbox"/>
	Other (please state):		11	Handing Over / Guarantee Period	<input type="checkbox"/>
11	<input type="checkbox"/>	12	Environmental Management	<input type="checkbox"/>
12	<input type="checkbox"/>	13	Other (please state):	<input type="checkbox"/>

C. HAVE YOU PROVIDED TRAINING COURSES IN THE AREA OF MANAGEMENT IN CONSTRUCTION FOR EMPLOYEES WITHIN THE LAST THREE YEARS? YES NO

If YES, please state the training area:

Type of the Course	Number of participants from organisation	SUBJECT
Internal		
External		

D. ARE YOU INTERESTED IN TRAINING COURSES IN THE AREA OF MANAGEMENT IN CONSTRUCTION FOR EMPLOYEES IN NEAR FUTURE? YES NO

D1. If YES please state the most relevant type of the course:

internal external distance learning method

D2. Estimate the number of future participants from your organisation who would attend training courses in areas of management in construction:

1-5 5-10 >10

E. DO YOU WISH TO RECEIVE MORE INFORMATION ABOUT THE LEONARDO DA VINCI PROJECT?

YES NO

If YES, please give detailed information below:

Name of the Organisation:

Name of the person: Title:

Phone: Fax: Email:

