

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1. Fulfillment of Objectives

The objectives of the research were to identify the factors that influence software process tailoring and selection decisions in software development projects and also to perform a correlation analysis of process decisions and project success/failure in the presence of varying factors. These objectives were successfully fulfilled and the following conclusions were arrived at.

Eleven factors listed below were identified in the study and these factors have varying influence on different software processes.

1. Project duration
2. Project team size
3. Customer requirements
4. Experience of the project team
5. Project's technical complexity
6. Project sponsor
7. Type of project
8. Related industry/ domain
9. Project value
10. Technology used
11. Organizational policies, standards and procedures



It was quite evident that organizational policies, standards and procedures play a major role in software processes. This factor decides the extent of practice of software processes used in a particular organization. Another notable factor was the industry or the domain of operation of the software company/ project. This decides what subset of processes is used for the project. The technology used will also decide the extent of usage of certain processes and how they are used. The technical complexity of the project also influences the processes with a high percentage. This is because it requires well established processes in place to make sure that the project is properly handled. The influence of customer requirements has also become higher mainly because it emphasizes the compliance and the quality of the product.

The project value has shown low influence on software process tailoring and selection against the common belief. The duration of the project is significant only on processes such as management, configuration management and documentation where as project team size shows significant influence on processes such as management, configuration management and problem resolution. Project sponsor is another insignificant factor on process tailoring. When the project team is experienced it has high impact on management and training processes only.

The correlation analysis carried out concludes with 99.9% confidence that there is positive correlation between process decisions and project success/ failure. Here the correlation analysis was done when the process decisions were made under varying factors. Therefore the importance of selecting appropriate software processes and tailoring according to various needs is justified through the analysis.

6.2. Project Success/ Failure

During the survey, data was captured in order to identify the basis on what a software project is considered successful. After analyzing the responses the following conclusions were made.

In projects that develop tailor-made software for specific clients the customer feedback and compliance to specifications are key parameters that decide the project success/ failure. Within budget and on-time completion also has high percentage of influence on the same.

Product quality is the most significant factor that decides the success of a software project that develops a general product. The other factors that were of high significance were customer feedback, within budget completion and compliance to specifications.

6.3. Sensitivity of Processes



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The process selection and tailoring activity of a software project should make sure that those processes that are more sensitive to varying factors are tailored with sufficient care to make sure that the project has the correct processes in place failing which the outcome of the project may suffer.

6.4. Outcome of Hypotheses Testing

The following are the outcomes obtained after testing the eleven hypotheses formulated.



Hypotheses	Conclusion Made
H1: Project duration have a significant bearing on the success of software process tailoring	False
H2: Project team size has no significant effect on the	True

software project success	
H3: Customer requirements will have high impact on process tailoring	True
H4: Experience of the project team is key factor for software process tailoring	False
H5: Project's technical complexity has high impact on software process tailoring	True
H6: Project sponsor has no significant impact on the software process tailoring	True
H7: Type of project will be a significant factor in software process tailoring	True
H8: Related industry/ domain has no impact on software process tailoring	False
H9: Project's monetary value has significant impact on process tailoring	False
H10: The technology used is not an important factor that decide on software process tailoring	False
H11: Organizational policies, standards and procedures are less important in deciding software process tailoring	False

6.5. Recommendations

The above analysis and discussion done lead to the following recommendations for software process tailoring.

1. Organizational policies, standards and procedures should be carefully laid down since it has vary high influence of software processes
2. Selection of technology and the size of the team should be appropriate for the project since it has very high bearing on software processes.

3. Those projects that are highly complex should be given due consideration since the software processes are highly sensitive to the level of complexity of the project.
4. Customer requirements should be understood and finalized properly in order to make sure that the processes are properly tailored to fulfill customer needs and expectations.
5. Process tailoring has to be done to suit the particular type of project.



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8.0 APPENDIX 1: SURVEY QUESTIONNAIRE



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The factors that affect the selection and tailoring of processes in Software Development Projects

This survey is carried out to identify the different factor that affect choice and tailoring of various processes in software development projects carried out by the software companies in Sri Lanka. The purpose of this survey is to collect data for my research project in the MBA(IT) program at University of Moratuwa. I assure you that your responses will be kept strictly confidential and will only be used in the data analysis in my research project.

This survey consists of three sections as follows:

Section A:	Company Details
Section B:	Questions on software process tailoring at your organization
Section C:	Questions on measurement of software project success

THIS SURVEY WILL TAKE APPROXIMATELY 30 MINUTES TO COMPLETE

For statistical validity, I would prefer if you respond to all the questions in this survey. However, you are under no obligation to answer every question.

INSTRUCTIONS

To complete this survey, please read each question carefully and answer by **ticking** the appropriate box (as shown)
OR writing your response in the space provided.

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Research Questionnaire

Section A: Company Details

1. Your Name *(Optional)*:
2. Company Name *(Optional)*:
3. Designation *(Optional)*:
4. No. of years of operation:
5. No. of staff involved in Software Development Projects:
6. Type of Software Projects handled:
 - a. Software Product Development
 - b. Tailor-made Software Development
 - c. Development of software outsourced by an intermediate party
 - d. Other (please specify)
.....
.....
.....
7. Software development tools used:
 - a. Microsoft .Net
 - b. Java
 - c. C++
 - d. Other (please specify)
.....
.....
.....
.....
8. Software Development Model(s) used:
 - a.
 - b.
 - c.
 - d.
9. Prior to the commencement of a software project does your company carry out process tailoring (selection or omission of certain processes and/ or fine tuning of the selected processes) in the software development model that you are going to use?
(Yes/ No)

If 'yes' please proceed to **Section B**. If 'No' please proceed to **Section C**.

Section B: Software Process Selection/ Tailoring

10. What are factors that you will consider in selecting/ tailoring the software processes? How they affect the processes? And how important the process on the overall success of the project?

Factors		Processes affected (please indicate the ranking. V. Low =1, Low=2, Average=3, High=4, V. High=5, Process can be omitted= 0)													
		1 Life cycle strategy i.e. waterfall/ evolutionary/ prototyping	2 Acquisition strategy (contract/ developed in-house/ COTS)	3 Supply process	4 Development process	5 Operation process	6 Maintenance process	7 Documentation process	8 Configuration management process	9 Quality assurance process	10 Verification process	11 Validation process	12 Joint review process	13 Audit process	14 Problem resolution process
1	Project duration														
2	Project team size														
3	Customer requirements														
4	Experience of the project team														
5	Project's technical complexity														
6	Project sponsor														
7	Type of project (product development/ customization, tailor made product, research project)														

Factors		Processes affected (please indicate the ranking. V. Low =1, Low=2, Average=3, High=4, V. High=5, Process can be omitted= 0)													
		1 Life cycle strategy i.e. waterfall/ evolutionary/ prototyping	2 Acquisition strategy (contract/ developed in-house/ COTS)	3 Supply process	4 Development process	5 Operation process	6 Maintenance process	7 Documentation process	8 Configuration management process	9 Quality assurance process	10 Verification process	11 Validation process	12 Joint review process	13 Audit process	14 Problem resolution process
8	Related industry/ domain														
9	Project value														
10	Technology used														
11	Organizational Policies, standards and procedures														
12															
13															
14	Overall impact on the project														



Factors		Processes affected (please indicate the ranking. V. Low =1, Low=2, Average=3, High=4, V. High=5, Process can be omitted= 0)											
		15. Management process	16. Infrastructure Process	17. Improvement Process	18. Training Process								
1	Project duration												
2	Project team size												
3	Customer requirements												
4	Experience of the project team												
5	Project's technical complexity												
6	Project sponsor												
7	Type of project (product development/ customization, tailor made product, research project)												
8	Related industry/ domain												
9	Project value												
10	Technology used												



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Factors		Processes affected (please indicate the ranking. V. Low =1, Low=2, Average=3, High=4, V. High=5, Process can be omitted= 0)												
		15. Management process	16. Infrastructure Process	17. Improvement Process	18. Training Process									
11	Organizational Policies, standards and procedures													
12														
13														
14	Overall impact on the project													

Section C

11. What are the parameters used for the measurement of software project success in your organization?

Parameters	Type of Software Project						
	(Please indicate the ranking. V. Low=1, Low=2, Average=3, High=4, V. High=5)						
	Product Development	Tailor-made Software Development	software outsourced by an intermediate party	Other (please specify)	Other (please specify)	Other (please specify)	Other (please specify)
1. On-time completion							
2. Within budget completion							
3. Compliance							
4. Quality of the product							
5. Customer feedback							
6. No. of issues during the project							
7. Management feedback							
8. Effort of the project team							
9. Ability to re-use							
10. Experience gained/ lessons learned							
11.							
12.							
14.							
15.							



12. According to your past experience in your current organization what were the successful projects? What were the unsuccessful projects and the reason for failure?

- ◇ No. of projects you were involved in:
- ◇ No. of successful projects:
- ◇ **No. of unsuccessful projects and reasons for failures**

Reasons for failure	No. of projects



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End of Questionnaire

Thank you for your participation

