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Softer Impediments in Legacy Software Transformation: Challenges and Lessons Learnt

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Abstract: This paper presents the findings about softer challenges in execution of big legacy transformation programs. Often it is seen that focus of findings remain around the technical solutions and challenges faced in this crucial journey of transformation, however this paper focuses on impediments related to softer issues, human psychology, organizational challenges, stakeholder's confidence and contribution. It reveals the impact of all these attributes in executing the legacy transformation program. Even with best in class technological expertise without addressing these softer issues many companies fail to execute the transformation programs. Significant softer impediments have been highlighted with practical recommendations to address them. These issues are the collection from the postmortems and lessons learnt out of real industry programs of transforming the legacy to modern solutions. The study presented here is a result of collaboration between academia and industry, based on rich enterprise architecture, software design, people management and service delivery experience and is aimed to benefit industry in real legacy transformation projects.

Keywords: Legacy transformation, re-engineering, reverse engineering, business IT alignment, impediments, post-mortem analysis.

1. INTRODUCTION

Big enterprises have been using software systems since long to run their enterprise operations and over time they have evolved as a back-bone of the organization's IT operations. Such software is commonly called LEGACY today. A legacy system is an operational system that has been designed, implemented and installed in a radically different environment than imposed by the current ICT strategy [1]. At certain stage organizations need to do the legacy modernization or transformation.

In this research paper, the study of two big real transformation programs with the intention to find causes of hurdles in execution. DAMLOG and DAMBILL projects are used as base of study. These programs were executed in world class hi-tech company. Outcome of this study is discussed in the next section as major hurdles

faced in legacy transformation. This study will try to determine factors of negative impacts in executing legacy transformation and see how much it's affected by technical issues vs. non-technical softer issues.

2. RELATED WORKS

There are several studies done via post mortem analysis of legacy transformation programs. Several studies focus on lessons learnt from programs which were failed [2], [3], [4] however few studies based on postmortem of successful executed programs [5], [6], [7]. There is another comprehensive study available [8], Kim Man Lui and Keith C. C. Chan have highlighted the learnings out of a project which was going in failure but later rescued to convert it in success. In [2], Herman Tromp and Ghislain Hoffman have suggested a methodology to follow certain steps to make the transformation successful. Need to have correct and agreed "as-is" situation in current environment and architecture. This Relevant action items are among others: evaluation of the existing COBOL code and underlying data structures. Also suggested to have the - "to-be" application architecture and separately determine "to-be" technical and deployment architecture. A critical evaluation was then suggested between the "as-is" and "to-be" situations. They also touched the softer issues and risks in study and hint to have management angles. In [8] Kim Man Lui and Keith C. C. Chan, have focused on the team structure and team composition to bring the effectiveness in the program execution. Soft skills like sharing domain knowledge is important aspect in reverse engineering [11].Current study of postmortem analysis focuses mainly on softer issues, which has been found much more important than any technical issues which may affect negatively the execution of transformation program. Also the study is unique as postmortem focuses the subject of legacy transformation.

3. CHALLENGES FACED IN TWO BIG LEGACY TRANSFORMATION PROGRAMS

The study presented here is exploratory in nature and based on the legacy transformation programs for company's global logistics and warehousing applications would be referred with name DAMLOG and similarly billing transformation is named DAMBILL program. Execution of these programs were finally successful but delayed by more than 300%, even with resources more than double compared to what was budgeted. Apart from the vendors, consultants more than 100 resources worked on these transformation programs spending on an average more than 12 hours a day with lot of continuous stress. Paper presents the study based on the experience and feedback on execution of these two transformation programs [9].

Measures were taken to mitigate the major risks to make the program successful which gave lot of learnings. Learnings were collected during major milestones of the project in the following format.

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Table 1
Lesson learnt log template used to collect inputs

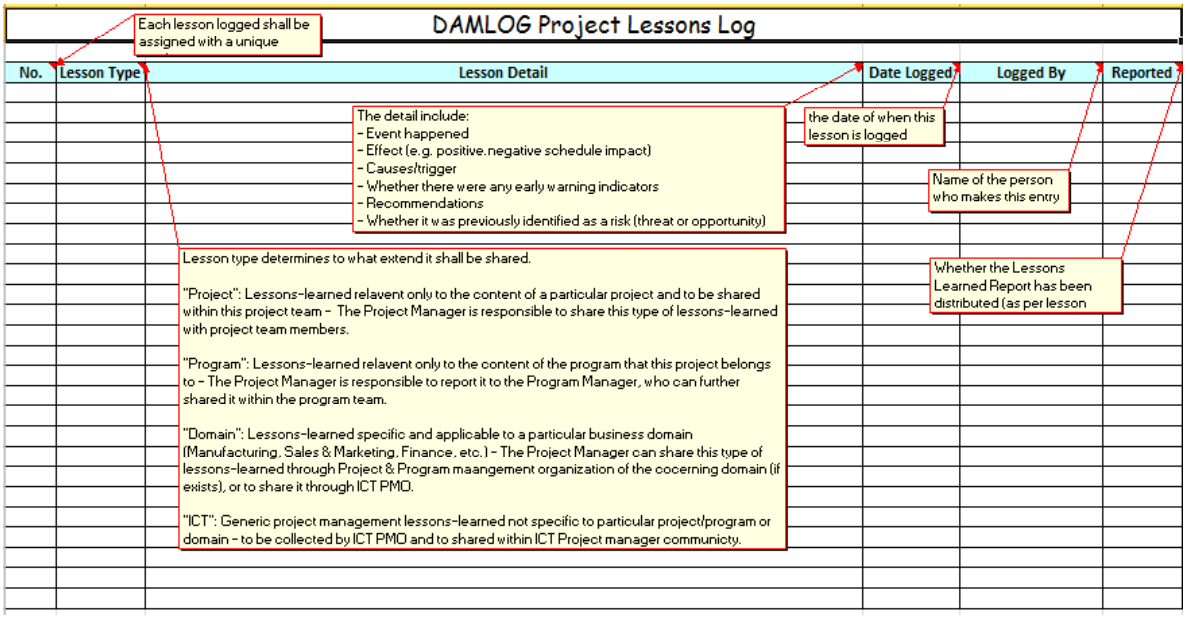

Table 2
Consolidated response in lessons learnt workshop of DAMLOG and DAMBILL

S. No.	*Factors Identified as TOP-10 by more than 20 persons (AROUND 40% of population)*	*Cumulative Frequency of TOP-10 issues (Left to Right)*										
1	Natural inertia*	12	4	7	3	5	3	3	4	2	1	44
2	Fear of losing jobs*	2	4	3	2	2	3	2	2	3	2	25
3	Indispensability Syndrome*	6	6	4	4	1	3	3	6	1		34
4	Legacy knowledge resides in minds*	3	2	1	4	1	4	1	3	2	4	25
5	Weak leadership	2	4	3	4	2		3	1	1		20
6	Insufficient communication	1	2	1	5	2		2	2	2	3	20
7	Lack of clarity in vision	1	1	2	2	5		2	2	4	1	20
8	Weak business case*	2	2	2	4	2	3	4	1	1	4	25
9	Lack in management commitment	2	4	3	2		1	3		3	2	20
10	Organization structure /program governance *	1	4	2	1	7	4	6		1	1	27
11	Not freezing evolution in legacy systems*	2	4	1	2	1	5	4	2	2	2	25
12	Incorrect prioritization	2			3	4		6	4		1	20
13	Treating as only ICT program	1	1	4	2	2			2	4	4	20
14	Not addressing business change mgmt *	2	2	1	3	1		6	4		6	25
15	Not setting right expectations *	5		3		4		2	2	5	5	26
16	Bad system architecture*	3	3	1	2	3	7		7		1	27
17	No effective tools of estimation	1		4		1	8			6		20
18	Bad technical choice	1	6	3	2	2	1	4		5	2	26
19	Low technical know how	1	1	4	3	1	5		5	1	3	24
	TOTAL	50	50	49	48	46	47	51	47	43	42	473

*Indicates all issues rated in TOP-10 by 25 or more people in workshop

Some observations from above data:

- Nineteen classes of attributes rated by twenty or more people under TOP10.
- Fifteen identified attributes are non-technical issues/softer challenges
- 'Natural inertia' is rated as top-most issue by maximum 12 people, 44 rated in TOP10
- Technical issues are perceived lesser impacting compared to softer issues
- Softer impediments and challenges were perceived significantly impacting the program execution.

Result of this workshop warrants to uncover these highlighted softer impediments, detailed for issues rated in top-10 by 25 or more people in workshop.

4. SOFTER IMPEDIMENTS

This section discusses the soft issues and attributes which were rated in TOP10 causes impacting negatively the legacy software transformation programs executed in a big enterprise. These are typically non-technical issues mostly related to human behavior, organization behavior, structures and people psychology.

Natural Inertia: It's human nature to resist change, especially when people are comfortable and more importantly habitual of using existing tools and procedures/practices. Ironically, in spite of being critical to a legacy technology it's replacement is never welcome by people on ground. Due to lack of involvement many of them go in to DON'T CARE approach which is detrimental to the transformation program.

Fear of Losing Jobs: People running legacy software have sometimes spent a prime of their work life to use and grow the legacy system and are quite resistant to migrate to new solutions fearing their jobs may become redundant either due to lack of knowledge they have on the new technology or sometimes an assessment that the new solution is intended to reduce the existing workforce and optimize operational costs.

Indispensability Syndrome: Legacy experts tend to feel as an indispensable lot having worked upon for years on the legacy system and also with an ever increasing scarcity of the legacy workforce, forced by employee mobility to newer avenues, legacy experts are usually carried away by indispensability syndrome.

Legacy Knowledge Resides in Minds not Digital: Most of the LEGACY systems are running on the basis of individual heroism and lack proper documentation on implemented solutions. With multiple change requests and bug fixes done over the years and having crossed many hands, documentation, if at all it exists is generally equally obsolete and does not correspond to the current state of the solution. Know-how needs to be built up over the course of the project so that support capabilities are in place on completion [10].

Weak Business Case: The business case identifies concrete benefits (revenues or savings) that the organization is intending with the transformation. Return on Investment (ROI) should be forecasted and viability of the cost and effort analyzed. So, before starting the transformation program, some questions need to be answered. What is the compelling need to execute the transformation? Did it already reach to legacy crisis? Are the solutions working well and not causing the huge maintenance?

Organization Structure: Most organizations have a very strict and hard line organization based on projects, which adds usually the latency and inability to adapt. It is clear that in such an environment there will be a lot of resistance towards new developments. The team organization for legacy transformation should have a central authority which strictly enforces architectural consistency and provide a deployment policy. Also having business stakeholders in program organization is must for success.

Not Freezing Evolution in Legacy Systems: Sometimes it has been seen that business users insist to keep carrying some legacy system behaviors which are costly in new system but the return value is very less. All such changes must be discarded. The Legacy code should be frozen and only minimal changes needed for business continuity or production bugs would be allowed in the legacy software which should be otherwise declared frozen.

Not Addressing Business Change Management: Business change management is integral part of the transformation program. Ultimately they are the real sponsors of the legacy transformation. Even if the top managers in business are aware yet if the business change management is not addressed well this may cause a setback to the program. This goes through the definition till the deployment of transformation program.

Not Setting Right Expectations of Legacy Transformation Results: It often happens that various stakeholders make very high expectations out of transformation results and modernization. Need to be careful and realistic while making commitments and presenting the transformation program. Business users may be dreaming for having full automation and no old pains, bug-free from day one, actions and executions performed on optical speed etc. on the other hand, IT management dreaming of excellent customer satisfaction. They may actually be expecting some magic and then get disappointed after the realization of the transformation.

5. RESULTS AND DISCUSSION

Result of post-mortem and lessons learning workshop from DAMLOG and DAMBILL projects revealed all important factors which are not considered significant in general. Paper discusses 9 soft issues which were in TOP10 list put by 25 or more people in workshop. 'Natural inertia' of ICT players as well as business stakeholders was identified as most impacting attribute rated on top by 12 people, and total 44 people (out of 55) have put this issue under top10 factors. All recommendations cited have been experimented under various situations and are based on implemented practices. Various challenges, both technical and softer challenges were faced during the course of execution. The learnings are practical enough to be implemented and have the potential to ensure higher success rate of similar programs with high investment implications and high risk probability.

Fifty five people participating to the post-mortem and lessons learnt workshop were a mix of several profiles ranging from core technical engineers and analysts up to the business representatives and top management. Experience levels were also from two year experience up to more than thirty years IT experienced profiles participated to this workshop. This gave a systematic perception from a good blend of experience and more the psychology.

6. CONCLUSION

This study presented here is unique in nature which elaborates a comprehensive view on the non-technical hurdles which usually organizations face in execution of legacy transformation programs internally or externally. Further to extend the study, it's needed to study how much pie is occupied by each of above highlighted issues out of the softer impediments part and best industry practices to overcome. But even in this form this study will definitely contribute in the success rate of legacy transformation programs and finally attribute to ROI of program. This paper highlights mainly the softer impediments with a hint to address those impediments. Although the human issues can't be managed with some magic formula most of the times and the solution is specific to the situation, person, organization, scenario in place. But the ways mentioned in this paper worked well in the transformation programs executed in different domains in ICT. Further to extend the study, the percentage impact of softer impediments on overall legacy transformation program is to be done. It's also needed to study how much pie is occupied by each of above highlighted issues out of the softer impediments part.

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