Lean Six Sigma Black Belt Project

GSU Graduate Application Processing Cost Reduction

Marijana Dragan
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1. Contents

2. Abstract

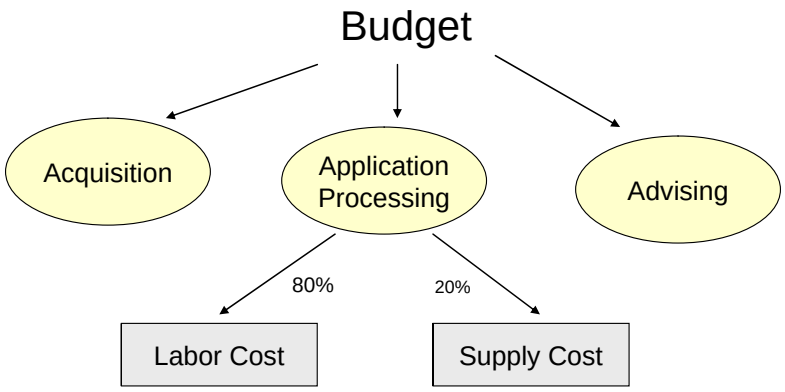
This is the pilot project that will show the use of the Lean Six Sigma methodology for reducing the cost of the graduate application processing at five colleges of Georgia State University. It is a part of the broader project that will also decrease cycle time and increase yield.
The cost reduction will result from the process re-engineering that includes the implementation of the centralized application data processing and integrated application web portal. There will also be changes in the student acceptance and enrollment policies.
At the later date, GSU cross-functional team will work on the realization of all three objectives at GSU graduate colleges: cost reduction, cycle time decrease and yield increase.

3. Define

3.1. Objective

Reduce GSU graduate application processing cost by 48%: from $403 to $193. The savings from the application processing will be used for advising and marketing in order to increase the yield.

3.2. Current State



3.3. Future State

Process changes that will reduce application costs and increase budget:

- only applicants with all the neccessary paperwork will be able to apply
- paperless application system
- all applicants will be accepted under the condition they maintain 3.0 GPA
- centralized data processing facility implementation
- use of scanning for transcripts submittal

- reduction of errors in application input
- adding and integration of web portal
- faster enrollment decision making process

3.4. Current and Future State Comparison

Applicants (2006)			**Current Addmission Costs**			**Current Outcomes**	
Applied	6,878		**Cost per Application**	**$403**		GSU Application Cost	$3,064,412
Incomplete	1,452		Labor Cost (80%)	$322			
Accepted	3,216		Supply Cost (20%)	$81		Enrolled Students	2,270
Withdrawn	724		Addit. Cost for Incompletes (50%)	$202			
Applicants (future)			**Future Admission Costs**			**Future Outcomes**	
Accepted	5,426		**Cost per Application**	**$193**		GSU Application Cost	$1,549,605
Regular Admission	3,798		Labor Cost Decrease (%)	50%		**Processing Savings**	**$1,514,807**
Provisional Admission	1,628		Supply Cost Decrease (%)	60%		Enrolled Students	4,341
			Centralized Facility Impl. Cost	$500,000		**Student Increase**	**2,071**

The savings in the first year the new process and system are implemented are estimated at $1, 514,807. They will be even higher in the subsequent years because there will be no cost for data processing facility implementation or the web portal adding and integration (estimated at $500,000 one-time cost).
The improved students' experience and the new admission system will increase the number of the enrolled students by 2,071.

3.5. Benchmarking

Below are the examples of the universities who achieved higher efficiencies in the application processing by opting for the paperless process and the centralized data processing.

Benchmarking for Cost Reduction

University of Wisconsin – Madison
- Eliminated duplication – applicants submit all materials to one place - Eliminated paper applications - Only required transcripts and financial information from the admitted international candidates - Improved online communications by posting prominent admissions information, checklists and requirements on website - Utilized website and new admissions system to reduce cycle time
Arizona State University
- Encouraged applicants to seek information via school website - Required applicants to look up codes for countries, graduate programs, institutions and degrees to free up staff resources - Utilized online application with minimal graphics
Oregon State University
- Abolished paper applications - Raised application fees and established higher application fees for international students - Collected all materials centrally - Created central scanning process for electronic data transfer to all departments
Ontario University
- Automated computer transformation of information to allow electronic data exchange

4. Measure

The calculations in this report are based on 2006 admission budget data and the number of applicants provided by A&S, AYSPS, COE, CHHS and RCB colleges. CHHS admission budget was not available and was estimated at $300,000. All data is yearly data. The cost structure was estimated because the true measures were not available for this pilot project.

4.1. Admission Budget and Costs

Admission Budget and Costs (2006)					
College	GAO Budget (total)	Applied Prospects	Application Processing Cost (average)	Labor Cost (80% of avg)	Supply Cost (20% of avg)
A&S	$417,965	1,503	$278	$222	$56
AYSPS	$186,593	367	$508	$407	$102
COE	$500,000	566	$883	$707	$177
RCB	$1,368,000	2,330	$587	$470	$117
CHHS*	$300,000	2,112	$142	$114	$28
Total	**$2,772,558**	**6,878**	**$403**	**$322**	**$81**

$$cost\ per\ application = \frac{admission\ budget}{number\ of\ applicants}$$

4.2. Cost Structure

The cost structure was estimated as follows:

Cost Structure (estimated values)	
Application Processing Cost	$403
Labor Cost (80%)	$322
Supply Cost (20%)	$81
Additional Cost for Incomplete Files (50%)	$202
Advising/Acquisition/Retention Costs	
86% of the current GSU budget	$18,981,445
Centralized Facility & Web Portal Implementation Cost	
one time cost	$500,000

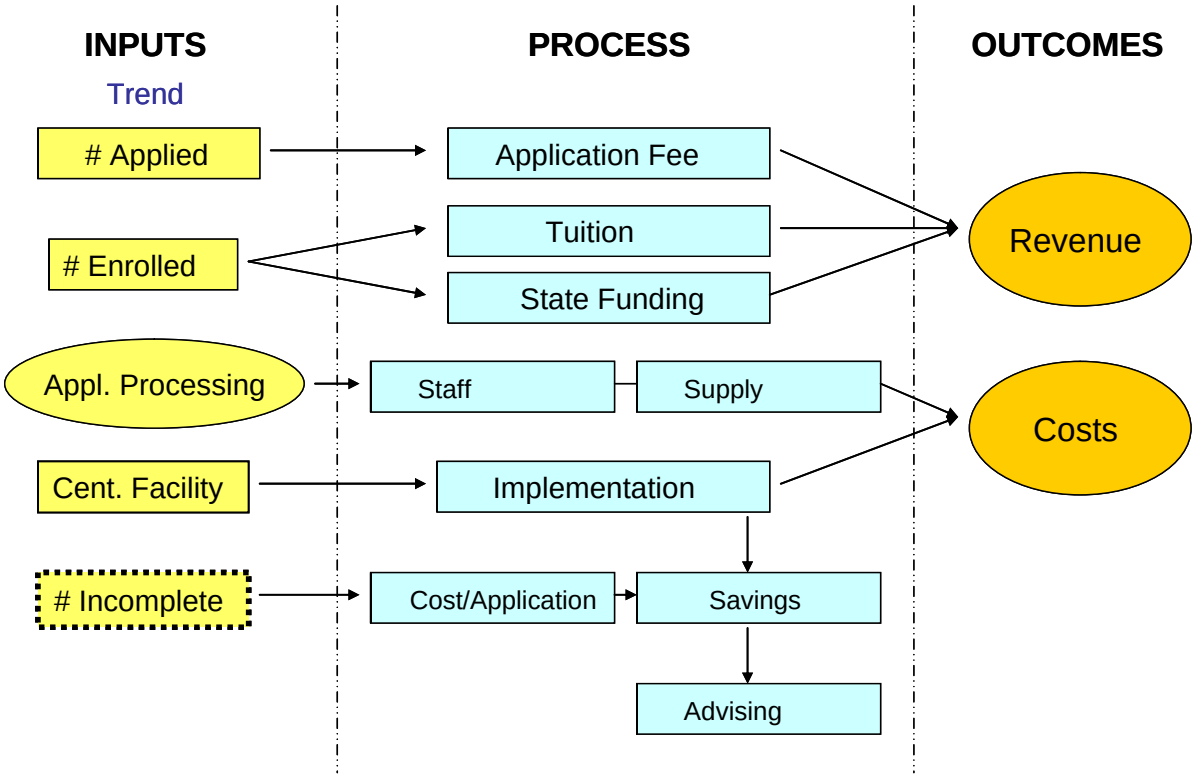
4.3. Applicants

The number of applications for 2006 was provided by all 5 colleges:

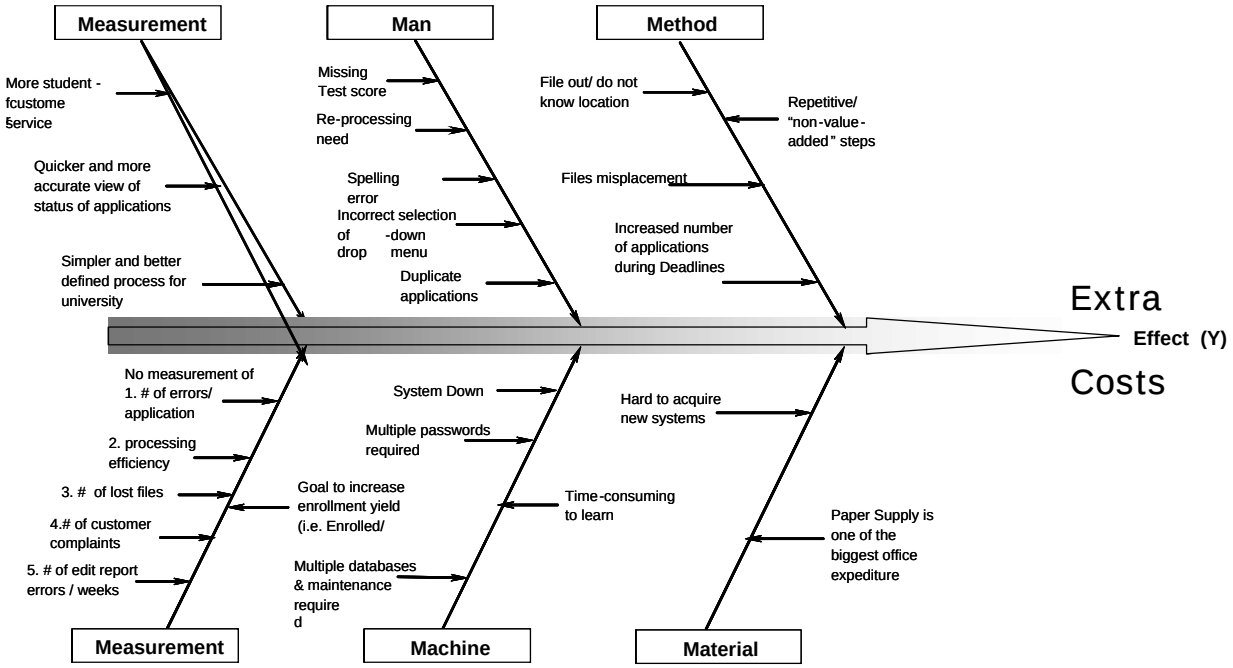
All GSU Colleges (2006)	
Applicants	
Applied	6,878
Accepted	3,216
Denied	1,486
Enrolled	2,270
Incomplete	1,452
Withdrawn	724

5. Analyze

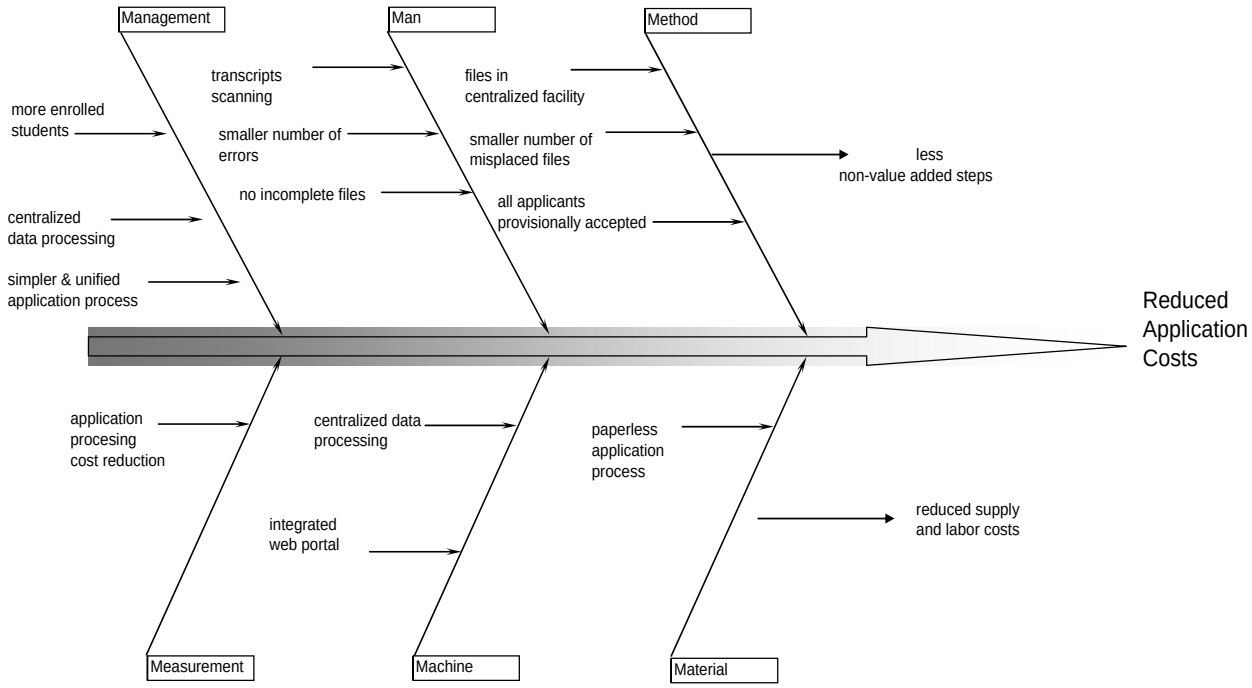
5.1. Influence Diagram



5.2. Current CE Diagram



5.3. Future Process Cause and Effect Diagram



5.4. DSS Assumptions

- all applicants with complete files will be accepted
- 70% of them will satisfy admission criteria. They will be pre-qualified after they submit their documentation and regularly admitted after GSU verifies their transcripts.
- 30% of them will be accepted under the condition they maintain 3.0 GPA in the first 2 semesters
- 80% of the accepted students will enroll. That is 10% increase in yield, as a result of the better student experience.
- the implementation of the new facility will decrease:
  labor costs by 50% (etimate)
  supply costs by 60% (estimate)
- the centralized facility and web portal implementation costs are $500,000 (estimate)
- there will be no incomplete files and that alone will generate the savings of **$292,578** **(** the processing of the incomplete files costs GSU 50% more than the complete ones)

$$savings\ on\ incompletes = addit.cost\ for\ incompletes * number\ of\ incompletes$$

The application processing cost would be $1,547,218 in the first year because new facility implementation is calculated in. However, in the subsequent years the application cost will be about $1,047,218.

5.5. Application Processing DSS

Applicants			Addmission Costs			Outcomes	
Applied	6,878		**Cost per Application**	$193		GSU Admission Cost	$1,547,218
Accepted	5,426		Labor Cost (80%)	$154			
Regular Admission	3,798		Supply Cost (20%)	$39		Enrolled Students	4,341
Provisional Admission	1,628		**Centralized Facility Impl. Cost**	$500,000			

5.6. Mathematical Representation of DSS

DSS Variable Explanations

Uncontrollable Inputs	
-	**Applied** - total number of prospects applied to GSU
-	**Accepted** = Applied minus Incomplete
-	**Regular Admission** = 70% of Accepted
-	**Provisional Admission -** 30% of the accepted applicants
Decision Inputs	
-	**Staff Cost**- estimated as 80% of admission budget
-	**Supply Cost -** estimated as 20% of admission budget
-	**Centralized System Implementation -** estimated one-time cost of $500,000
Outcomes	
-	**GSU Admission Cost** - (# of accepted) * (application processing cost)
-	**Enrolled Students -** 80% of the accepted applicants

5.7. Sensitivity Analysis

If GSU uses part of the savings from the application processing to offer better advising services to the students who withdraw - and keeps only 20% of them in school – the number of the graduate GSU students would increase by 145.

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Withdrawn Students	724			Student Number Increase	145

5.8. Scenario Analysis

If GSU reduces labor cost by only 10% and the supply cost by 20%, after the new system is implemented, the application processing clost could be reduced by almost 25%. It is realistic to expect such a reduction due to higher efficiency in processing once the employees are familiar with the system.

Scenario Summary		
	Current Values:	Future Values
Changing Cells:		
Labor Cost	154	139
Supply Cost	39	31
Result Cells:		
Application Cost	$1,547,218	$1,169,260
Savings ($)		**$377,958**
Savings (%)		**24.43%**

5.9. Forecasting

GSU should track the application processing costs for at least 5 semesters after the centralized facility implementation to be able to forecast the costs. At the moment this pilot project is created, there is not enough data to forecast the costs. The labor and supply costs should be tracked separately.

Since the application processing cost will be going down after the implementation of the new system, GSU will be able to use the savings for advising and marketing, thus increasing the number of enrolled students.

In the first year of the new system, the number of enrolled students will increase dramatically (150%) because all applicants with complete files will be accepted and 80% of the accepted ones will enroll.

6. Improve

6.1. Implementation of the Future State

1. Centralize application data with de-centralized decision making:
   - central scanning facility will drastically reduce supply costs

2. Add and integrate application web portal to enable multiple college application
   - paperless application process will result in significant savings
   - data entry errors will be reduced

3. Cross-selling of the graduate programs to increase tuition and state funding revenue

4. Change the university acceptance policy
   - all applied students will be accepted
   - elimination of incomplete applications will reduce application costs

5. Perform accurate pre/post analysis of transaction cost per application

6. Collect transaction cost data for every semester to monitor changes in the cost structure: labor and supply costs are expected to decrease

7. Set the enrollment goals to maximize the budget

6.2. Needs for Implementation of a Central Facility

It is difficult to estimate the true savings, without knowing the exact cost structure, but it is easy to see that the potential savings are significant.
The costs of the central facility implementation are estimated at $500,000. If the labor cost decreases by 50% and the supply cost decreases by 60%, for example, GSU will save $1,514,807 on application processing. After the cost of the implementation is amortized, the savings will be at least $2,014,807.

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After the centralized facility is implemented the savings are expected to increase as the staff better adjusts to the new system.

6.3. Training Needs

- minimal because the new technology will be user friendly
- mangement orientation on the changes in the admission process (2 days)

- admission staff training on the use of the centralized portal and the scaning facility; work re-organization (1 week)
- admission staff training on cross-selling of graduate programs, marketing towards potential GSU applicants and better advisment services (1 week)

6.4. Kaizen for Establishing an Implementation Plan

1. form empowered team from IT, finance and all 5 admission offices
2. do the best estimate of the average labor and supply cost structure and calculate transaction cost
3. benchmark for the integrated web portal (Georgia WebMBA is a great example!) and the scanning facility that mimimalizes the supply cost
4. survey the admission office employees of all 5 colleges: **where are the possibilities for the cost reduction**
5. the cross-functional team should observe the work in the admission offices for 2 weeks – just before the enrollment deadline: find out how to organize scanning facility and portal in the most efficient way for staff that will be working there

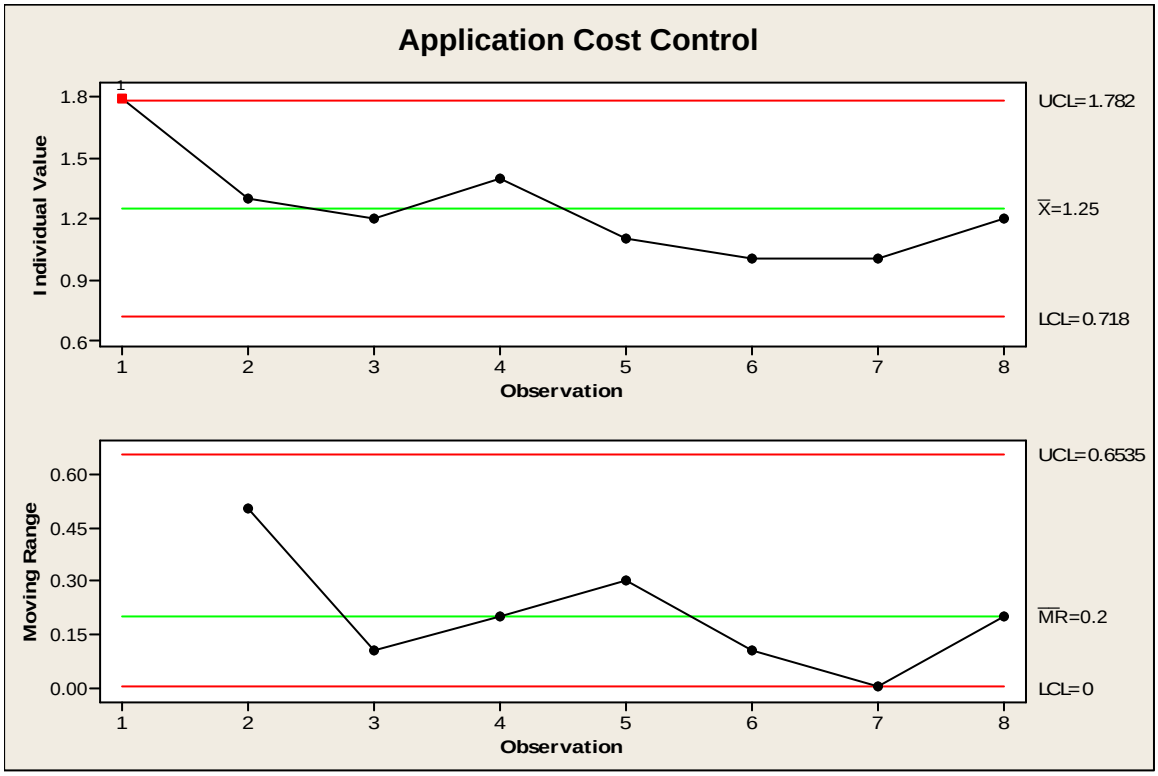
7. Control

7.1. Cost Control Suggestions

GSU should collect semester data on application processing cost in order to monitor the costs. The application processing costs should be monitored together with the cycle time decrease and the yield increase.

7.2. I-MR Control Chart

I created a simulated cost X-bar-S control chart for the application cost as an example. The costs are estmated (in millions) and the simulation data I used is in the table below chart. The assumption for my estimate was that the yearly application costs will decrease after the new system is implemented. The costs are within acceptable limits – but please keep in mind that this is a simulated data.



The costs are in millions and randomly estimated, to show the methodology, since no data was available.

Cost Control Data	
Year	Application Processing Cost
2006	1.8
2007	1.3
2008	1.2
2009	1.4
2010	1.1
2011	1
2012	1
2013	1.2

GSU should calculate application processing cost every semester in order to keep the costs within acceptable limits.

8. Conclusion

This is the pilot project and I tried to be conservative in my estimates. The GSU cross-functional team will implement this Lean Six Sigma project and this report is a guidance for them.
The implementation of the centralized system coupled with the changes in the enrollment process will reduce the application processing cost by $1,514,807 in the first year and I expect that the savings will be even higher after that due to process efficiencies.
Moreover, the school budget should increase significantly because the application processing costs will be used for the acquisition of the new students and better customer service to the existing students – increasing their satisfaction and GSU goodwill.