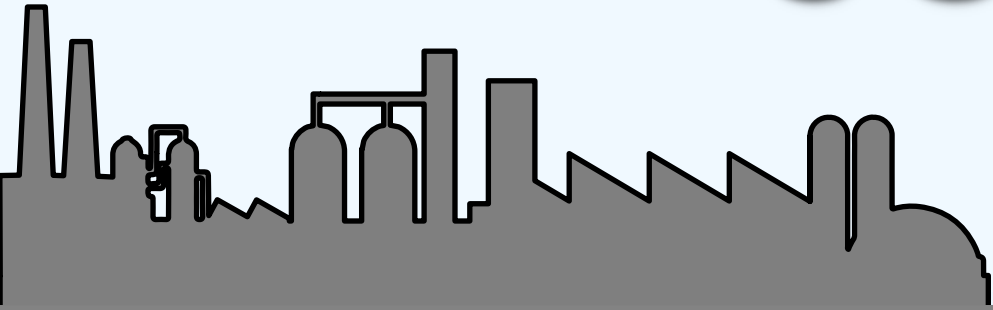
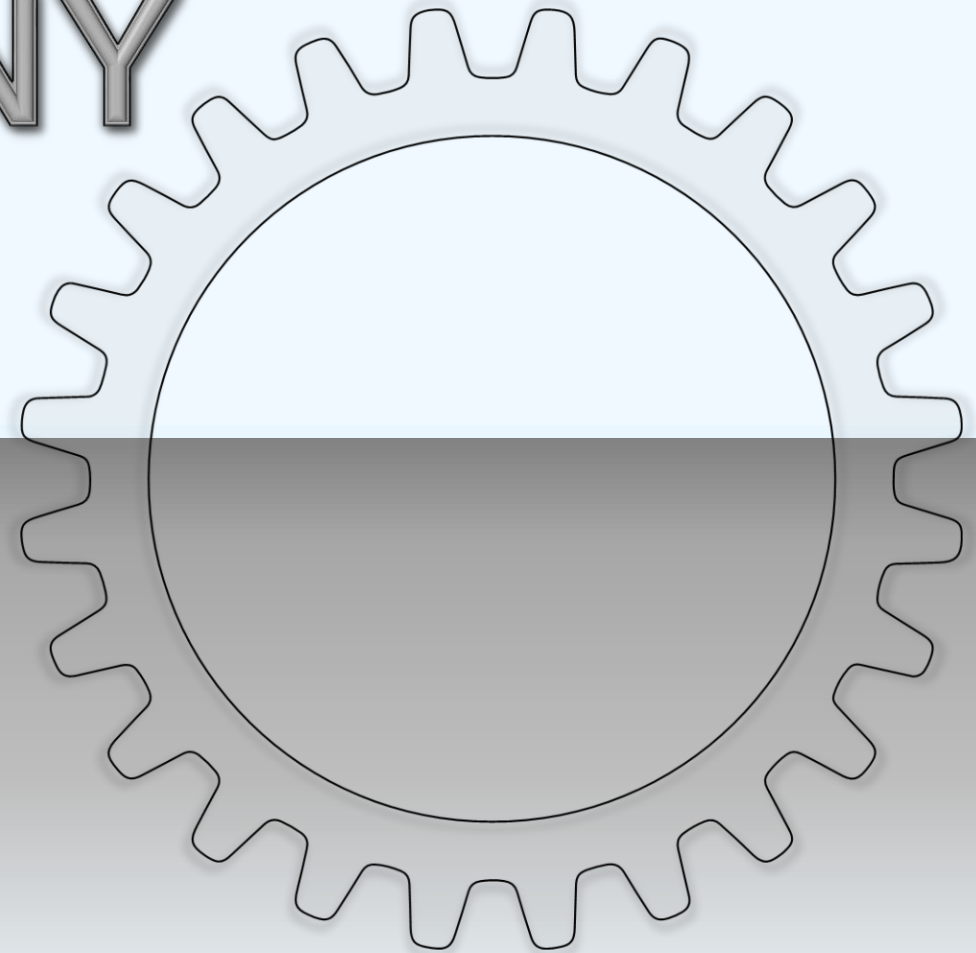


HIGH GEAR ENGINE COMPANY



*Project Team: Will Bobe, Alivia
Coon, Charles Ajax Hulebak,
Edward Kim*



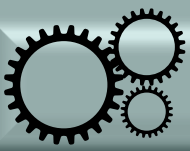


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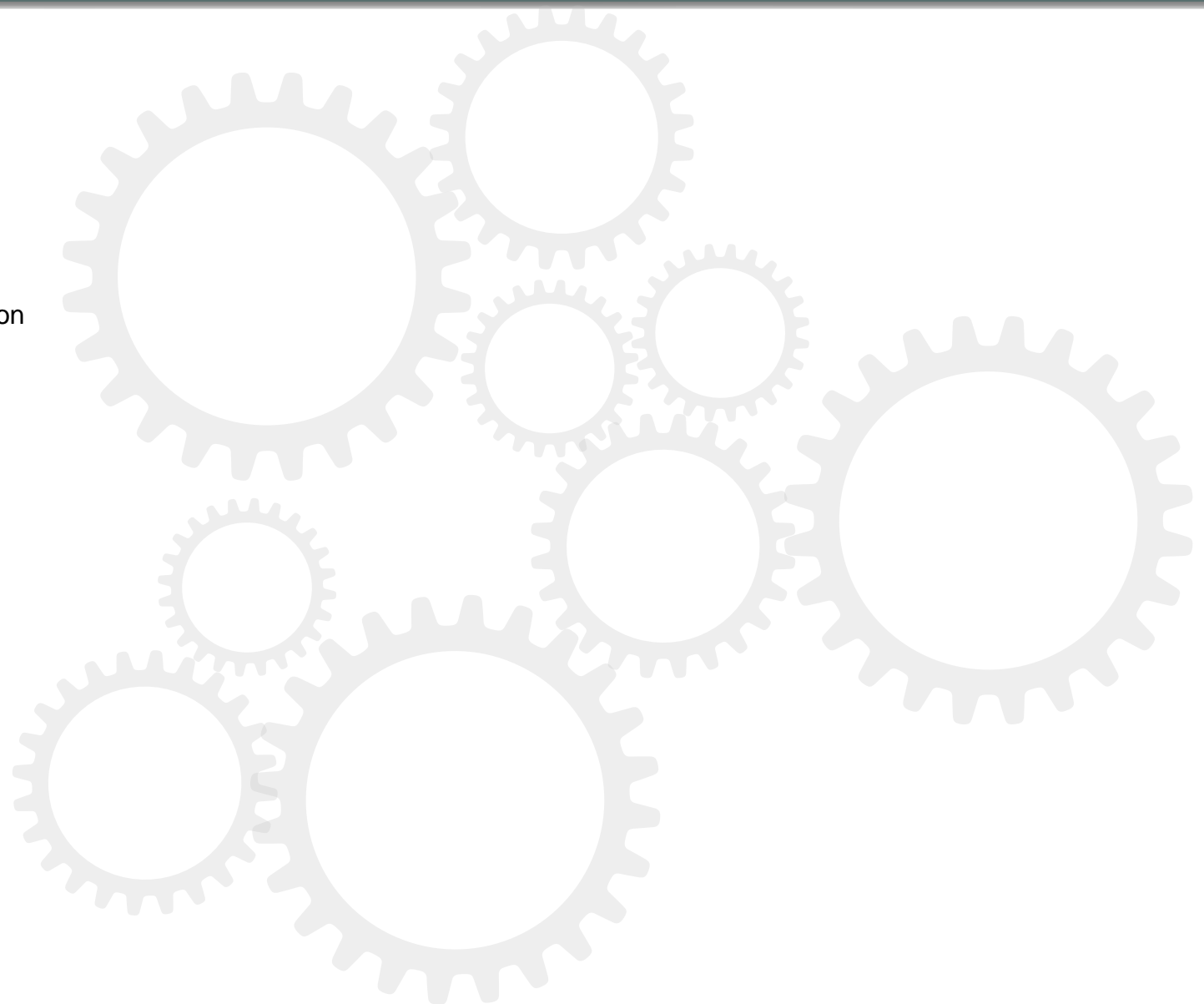
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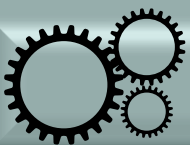
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The background features a series of interlocking gears of various sizes, rendered in a light gray color. A bright, glowing light source is positioned at the top center, creating a horizontal beam of light that illuminates the scene. The overall aesthetic is technical and industrial.

Background

A concise history of HG and root issues



High Gear History

High Gear Engine Company (HG) is a global automotive supplier with operations around the world. Founded in 1937, HG specializes in engines for automobiles, industrial, mining and farming equipment, and many others.

HG business units and specializations:

- **Velocity Engines** – Focuses on high-end sports cars and consumer-grade engines. These products command a premium in the market and
- **Long Haul Motors** – Produces diesel and large engines for semi-trailer trucks. Long haul is known well known in the market for its durability and is a recognized leader in the trucking industry.
- **Bigger Digger Power and Motor** – Specializes in mining equipment engines and motors. They supply to the major mining and industrial equipment manufacturers and often “white label” their engines as their customers’ brand.

HG is located in Detroit, Michigan and has over 75 plants, performance labs and manufacturing facilities worldwide.



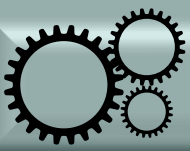
Image Credit: MustangJoe from Pixabay



Image Credit: David Jewiss from Pixabay



Image Credit: darkworkX from Pixabay

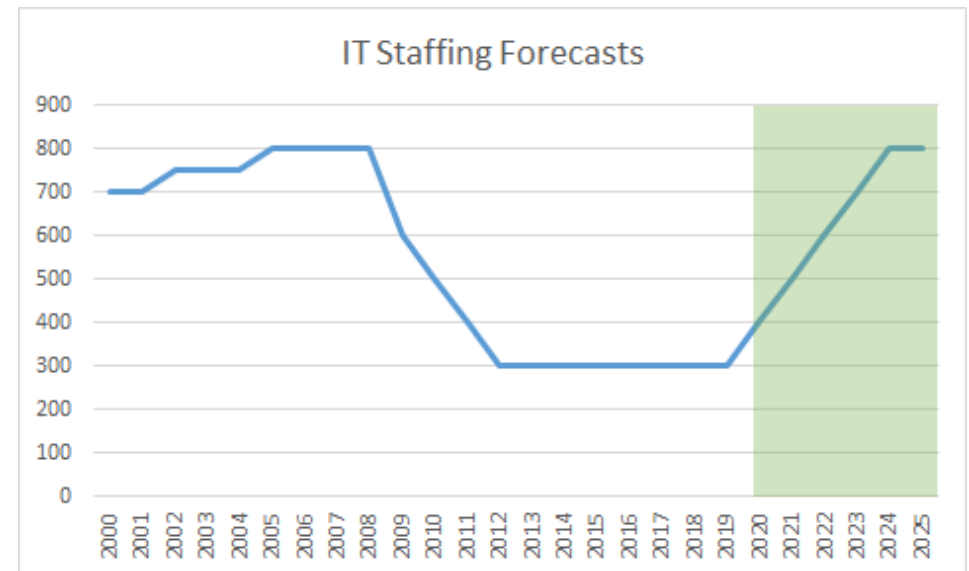
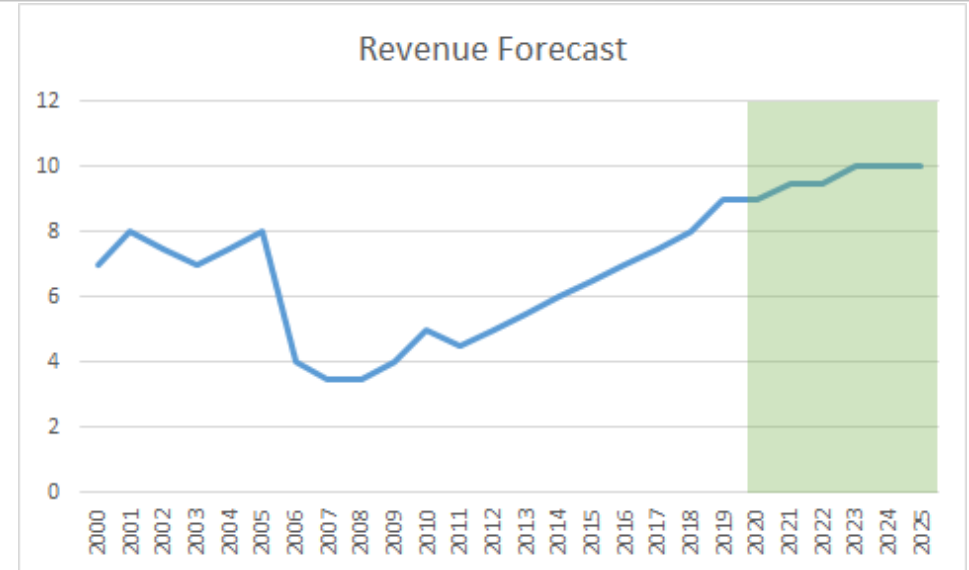


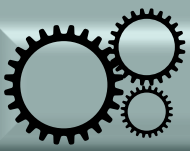
IT Background

HG was purchased by Velocity Partners following bankruptcy and the economic downturn in 2008. In effort to remain competitive in the business, HG downsized by reducing employees and closing several global locations. Business has increased during the past five years, increasing profitability and revenue over \$9 billion annually, with plans for 17% compounded annual revenue growth and a profit margin of 15%. These business successes and future forecasts are providing the ability to reopen some factories and other opportunities to support future growth.

HG is seeking to support this future growth by making some major changes in technology, which has been deferred for nearly a decade and needing improvements to infrastructure and applications. Prior to economic shifts, the HG IT department had over 800 employees, dedicated teams for each business unit and centralized team to share corporate responsibilities for IT systems. There was an excessive amount redundancies and duplicated efforts, ranging from personnel to systems. HG currently employs a much smaller amount of personnel, with about 300 personnel to manage the responsibilities, while IT support and services have suffered. In effort to main

In effort to improve future growth for HG's technology transformation, HG has hired a new CIO, Sara Miller, who is a seasoned executive with industry experience and eagerness to develop both short and long-term solutions for the company.





Corporate Information Technology Functions

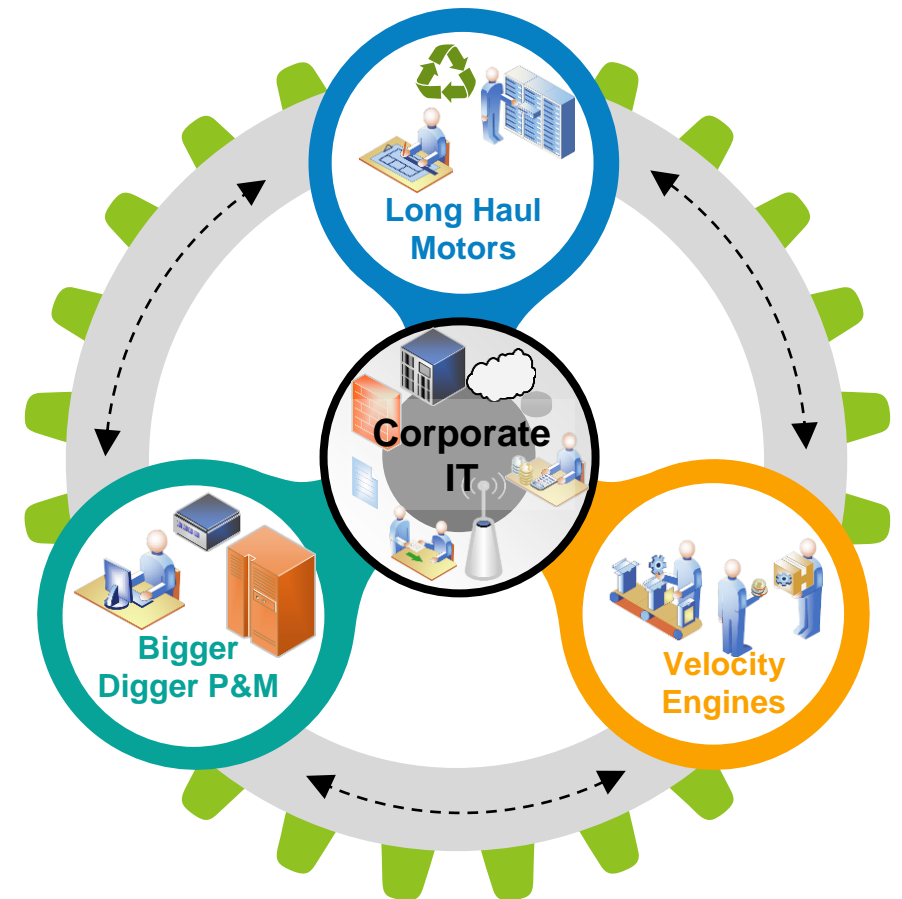
Following the economic shifts, HG has operated as three independent business units with management by corporate IT.

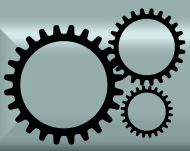
Corporate and shared IT functions:

- Information Security
- IT Risk Management
- IT Audit and Compliance
- IT Operations
- Disaster Recovery
- IT Infrastructure
- IT Strategy
- Email and Office Productivity
- Telecommunications
- Enterprise Architecture
- IT Financial Management
- Business Analytics and Information Management
- EDI (Electronic Data Interchange)
- IT Program Management
- IT Helpdesk and Support
- IT Vendor Management

Business unit IT functions:

- Engineering and CAD Systems
- Product Lifecycle Management
- Research and Development
- ERP Systems
- Supply Chain Systems
- Customer Relationship Management Systems
- Business Initiative Program Management
- Manufacturing and Shop-Floor Systems





Information Technology Challenges

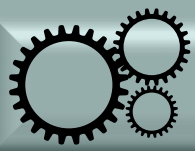
The new CIOs first three weeks were spent interviewing all the major business and IT stakeholders in the company. Her preliminary observations included:

- No one is accountable for information security
- Connectivity is a problem
- There are too many ERPs and they are expensive to maintain
- IT audit issues are piling up
- Manufacturing and shop floor systems are old and causing the production line to stop
- PCs and operating systems are old and unsupported
- No one understands how the applications and business systems work except the vendor

In response to these challenges, Miller is seeking to incorporate an IT Risk Management Framework in alignment with the business continuity plan to meet the current and future needs of HG.



Image Credit: Gerd Altmann from Pixabay



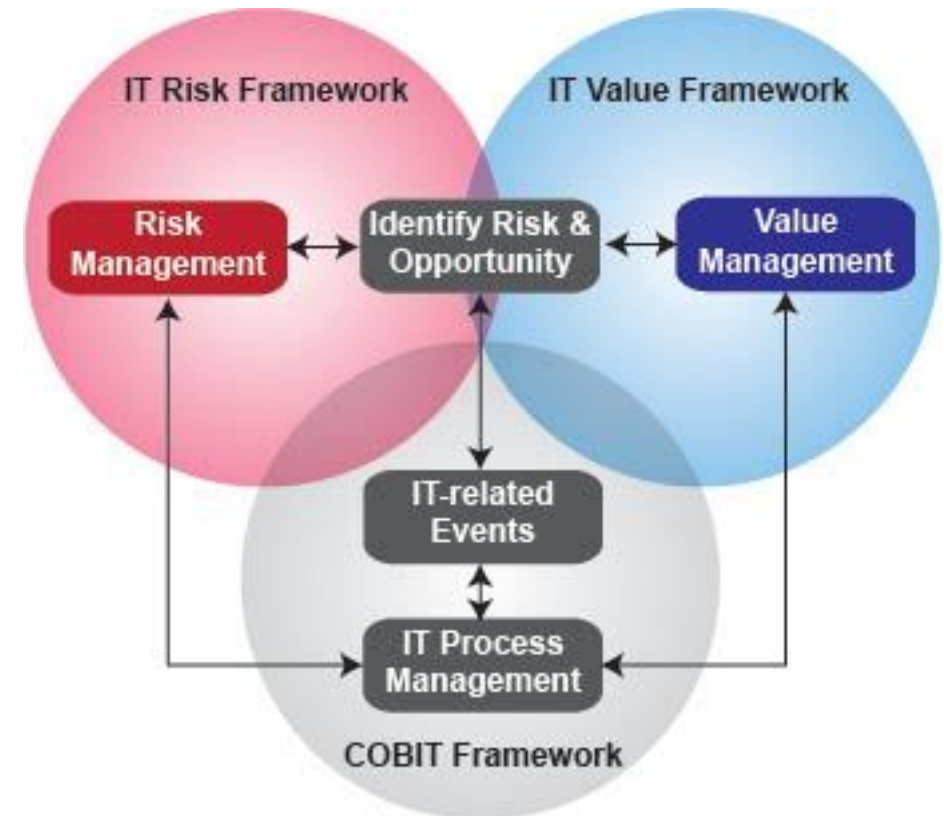
Information Technology Risk Management

Miller is seeking to incorporate ISACA'S Risk IT framework, complementing COBIT while focused on positioning HG IT with business objectives, building trust and value.

Her tangible business efforts are focused on fewer operational surprises and failures, increased information quality, greater stakeholder confidence, reduced regulatory concerns, and innovative applications supporting new business initiatives.

ISACA's risk management framework is divided into three domains, including Risk Governance, Risk Evaluation, and Risk Response.

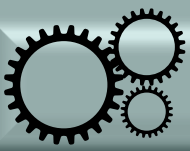
The IT risk framework is seeking to provide transparency with end-to-end processes, identifying adverse IT-related risks that could impact a range of internal and external stakeholders, including executive management, corporate risk managers, operational risk managers, business continuity managers, CFOs, business managers, regulators, insurers and more.





Scope and Approach

Enterprise, Business Units, and Shared IT Responsibilities



Main Concerns

HG has undergone a history of transformation, and as the company strategizes success into the future many considerations will have to consider.

- Transforming the IT from decentralized to a centralized department between corporate, business units, and shared responsibilities.
- Resolving many of Miller's observations, which have created projects and urgent action items to be addressed within the next three months.
- Utilizing ISACA's IT Risk Management framework, HG has translated many of their largest challenges toward short and long-range implementation plans.

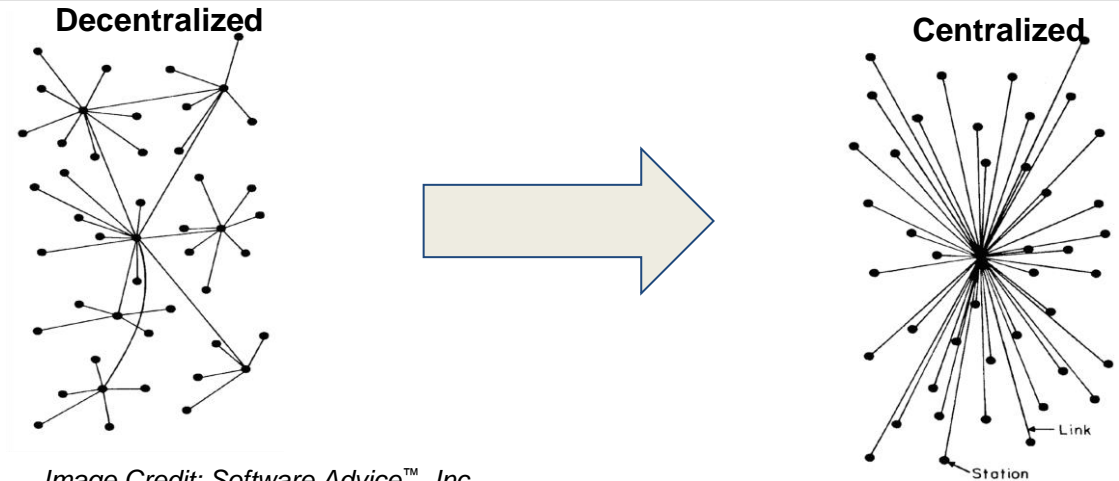
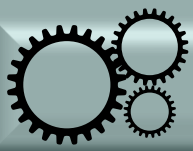


Image Credit: Software Advice™, Inc.



Image Credit: ISACA



Information Technology Department Transformation

HG's IT department historically operated with over 800 staff members, with dedicated teams for each business unit and a centralized team to operated the shared corporate IT systems. Previous to that, HG IT was very decentralized with CIOs for each of the businesses, and dual reporting lines to each business unit and the global CIO of HG.

There were many redundant systems and functions, and although the decision to centralize was recognized to yield cost savings and create efficiency, the leadership was reluctant to make changes because the business units were previously performing well. This was the trend until HG hit bankruptcy.

As the turmoil settled, HG IT has remained focused on business recovery and profitability. With increasing profits and a much stronger IT budget, HG IT is seeking to transform into the most highly efficient department within the organization.

This transformation is going to be led by Miller, who is seeking to bring more autonomy between the business units, with a focus toward reliability, compliance, and company profitability.

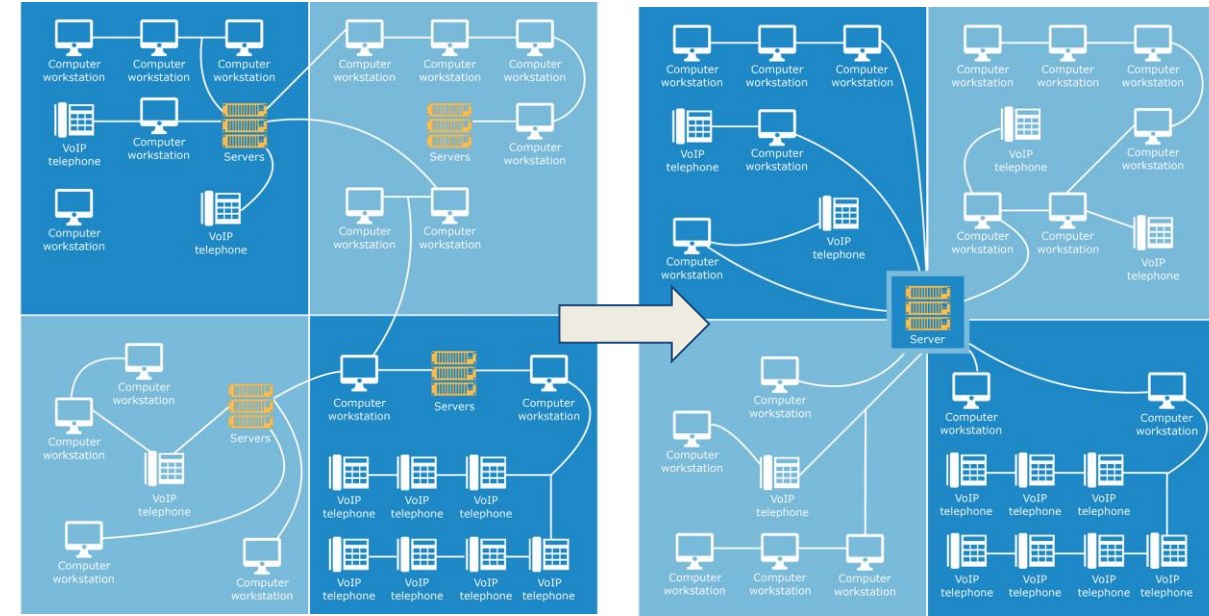
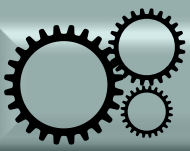


Image Credit: Software Advice™, Inc.

When it is important to have... ...it is usually advantageous to veer toward... ...as that solution enables and stimulates...	Responsiveness	Reliability	Efficiency	Perennity
	Decentralization	Centralization	Centralization	Centralization
	Immediacy	Compliance	Syndication	Detachment

Image Credit: HBR.org



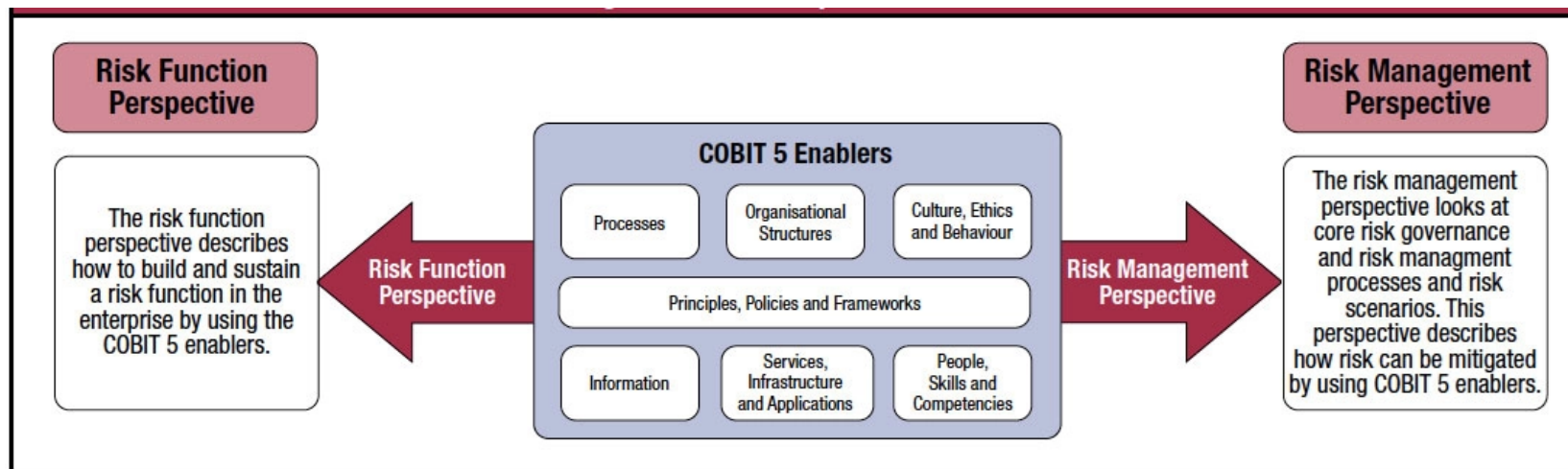
IT Risk Approach

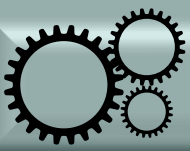
Miller has recognized that many of the business goals and objectives have been impacted by a neglected IT department over the years.

Utilizing the COBIT framework, she is seeking to address business goals related to financial performance, customers, internal efficiencies, while promoting business growth.

Furthermore, Miller seeks to translate these 7 observations into many projects to address the needs of HG and the IT department within the near-term future, as well as phased implementations during the next few years of the department and business growth. Miller is intending to incorporate the ISACA Risk IT Framework which will address Risk Evaluation, Risk Governance, and Risk Response.

For the future of HG IT and following the implementation of these projects, Miller is seeking to participate in the next HG Risk Audit, in which the IT department can be assessed with other business lines as part of the Risk Universe analysis.



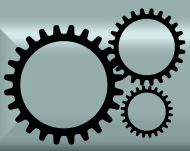


Translating Observations into an Action Plan

Miller's initial observations include:

These observations have generated the following twenty projects:

<ul style="list-style-type: none">• No one is accountable for information security	<ul style="list-style-type: none">• Hire information security manager and 1 security analyst for each business unit• Enterprise AV license• Firewall• Additional software (i.e. VPN, network security tools, manuals)• Advanced infosec annual training for security team• Basic infosec training for company, quarterly/annual (4 hours p/staff)• Hire annual external consultant for penetration testing and assessment
<ul style="list-style-type: none">• Connectivity is a problem	<ul style="list-style-type: none">• Determine business internet speed, increase service plan for bandwidth increase or additional (redundant) data line• Invest in IT capital improvements, servers, new router, switch, and infrastructure equipment & Service Plans• Configure firewall and network equipment to limit unnecessary data on network
<ul style="list-style-type: none">• There are too many ERPs and they are expensive to maintain	<ul style="list-style-type: none">• Consolidate and streamline business processes to meet current business needs• Invest in a 3rd party ERP suite
<ul style="list-style-type: none">• IT audit issues are piling up	<ul style="list-style-type: none">• Hire an internal IT auditor to work in partnership with corporate and business units• External IT audit consultant, annually
<ul style="list-style-type: none">• Manufacturing and shop floor systems are old and causing the production line to stop	<ul style="list-style-type: none">• Replace shop floor systems and establish redundant support systems, i.e. RAID and UPS• IT security analysts responsible for monthly audits of essential systems, and weekly audits of critical systems
<ul style="list-style-type: none">• PCs and operating systems are old and unsupported	<ul style="list-style-type: none">• Develop corporate-wide phasing plan to standardize and replace old systems and applications• Replace 5000 computers with business applications• Applications and specialized software, updated
<ul style="list-style-type: none">• No one understands how the applications and business systems work except the vendor	<ul style="list-style-type: none">• Quarterly/Annual training IT training budget



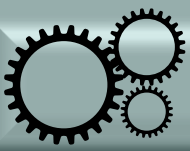
COBIT Categorization of Risks

This figure describes COBIT business goals and impacts mapped using COBIT information criteria.

Immediate IT Department Business Objectives		COBIT Information Criteria						
		Effectiveness	Efficiency	Confidentiality	Integrity	Availability	Compliance	Reliability
No one is accountable for information security								
Project 1	Hire information security manager and 1 security analyst for each business unit							
Project 2	Enterprise AV license							
Project 3	Firewall							
Project 4	Additional software (i.e. VPN, network security tools, manuals)							
Project 5	Advanced infosec annual training for security team							
Project 6	Basic infosec training for company, quarterly/annual (4 hours p/staff)							
Project 7	Hire annual external consultant for penetration testing and assessment							
Connectivity is a problem								
Project 8	Determine business internet speed, increase service plan for bandwidth increase or additional (redundant) data line							
Project 9	Invest in IT capital improvements, servers, new router, switch, and infrastructure equipment & Service Plans							
Project 10	Configure firewall and network equipment to limit unnecessary data on network							
There are too many ERPs and they are expensive to maintain								
Project 11	Consolidate and streamline business processes to meet current business needs							
Project 12	Invest in a 3 rd party ERP suite							
IT audit issues are piling up								
Project 13	Hire an internal IT auditor to work in partnership with corporate and business units							
Project 14	External IT audit consultant, annually							
Manufacturing and shop floor systems are old and causing the production line to stop								
Project 15	Replace shop floor systems and establish redundant support systems, i.e. RAID and UPS							
Project 16	IT security analysts responsible for monthly audits of essential systems, and weekly audits of							
PCs and operating systems are old and unsupported								
Project 17	Develop corporate-wide phasing plan to standardize and replace old systems and applications							
Project 18	Replace 5000 computers with business applications							
Project 19	Applications and specialized software, updated							
No one understands how the applications and business systems work except the vendor								
Project 20	Quarterly/Annual training IT training budget							

The background features a series of interlocking gears of various sizes, rendered in a light gray color. A bright, horizontal light flare or glow effect is positioned across the upper portion of the image, creating a sense of depth and focus. The overall color palette is a range of grays, from light to dark.

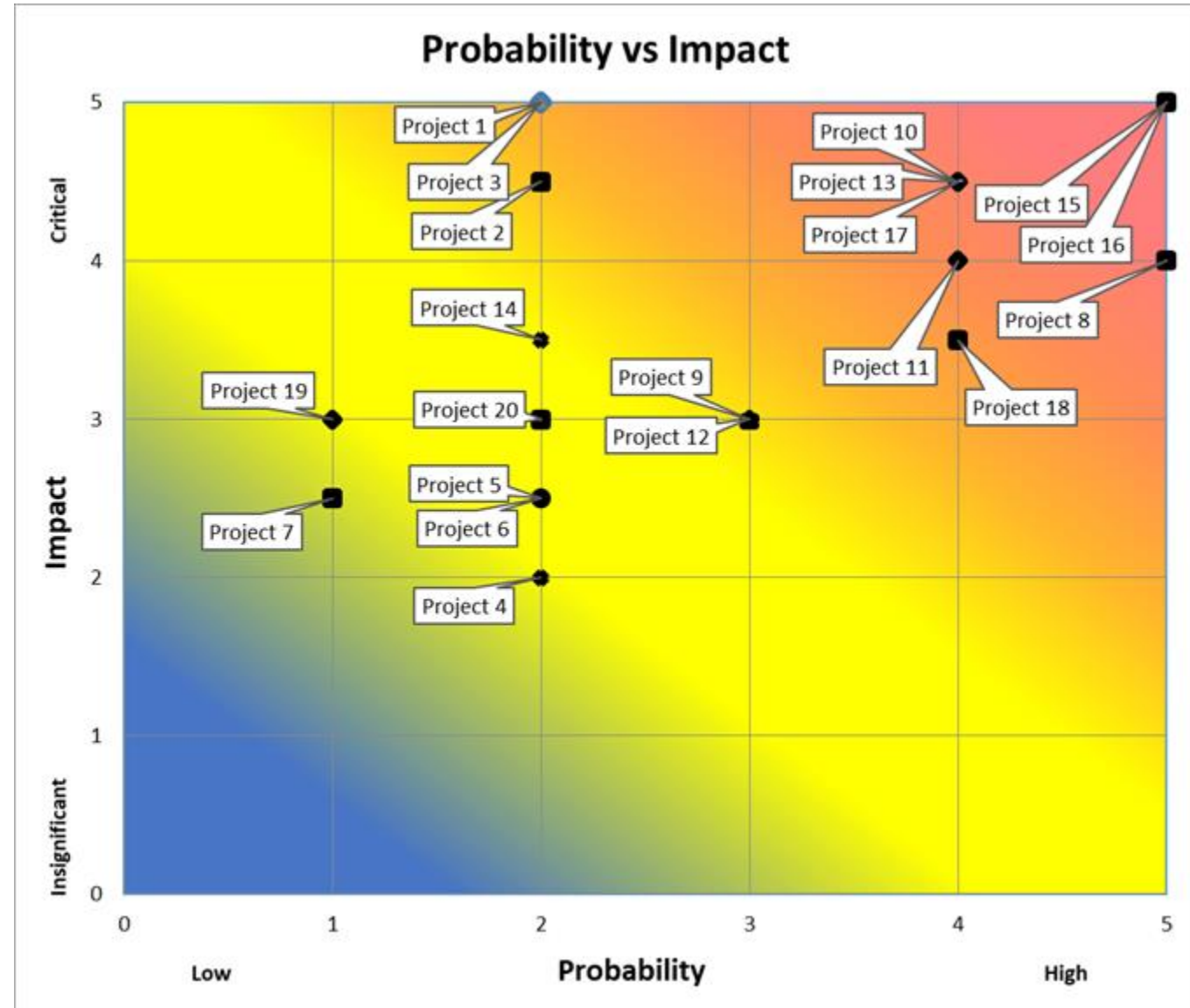
Calculating and Prioritizing Risks

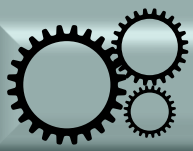


Quantifying Probability and Impact

Following the ability to analyze the probability of the risk occurrence (scale of 1-5), Impact to the business (scale 1-5), and impact occurrence timeframe (near, medium, and far) associated with these risks, a probability and impact matrix provided insight for subsequent analysis. both the prioritization and scheduling of completing these objectives. (refer to Addendum A for data)

$$\text{Risk} = \text{Probability (or Likelihood)} \times \text{Impact}$$

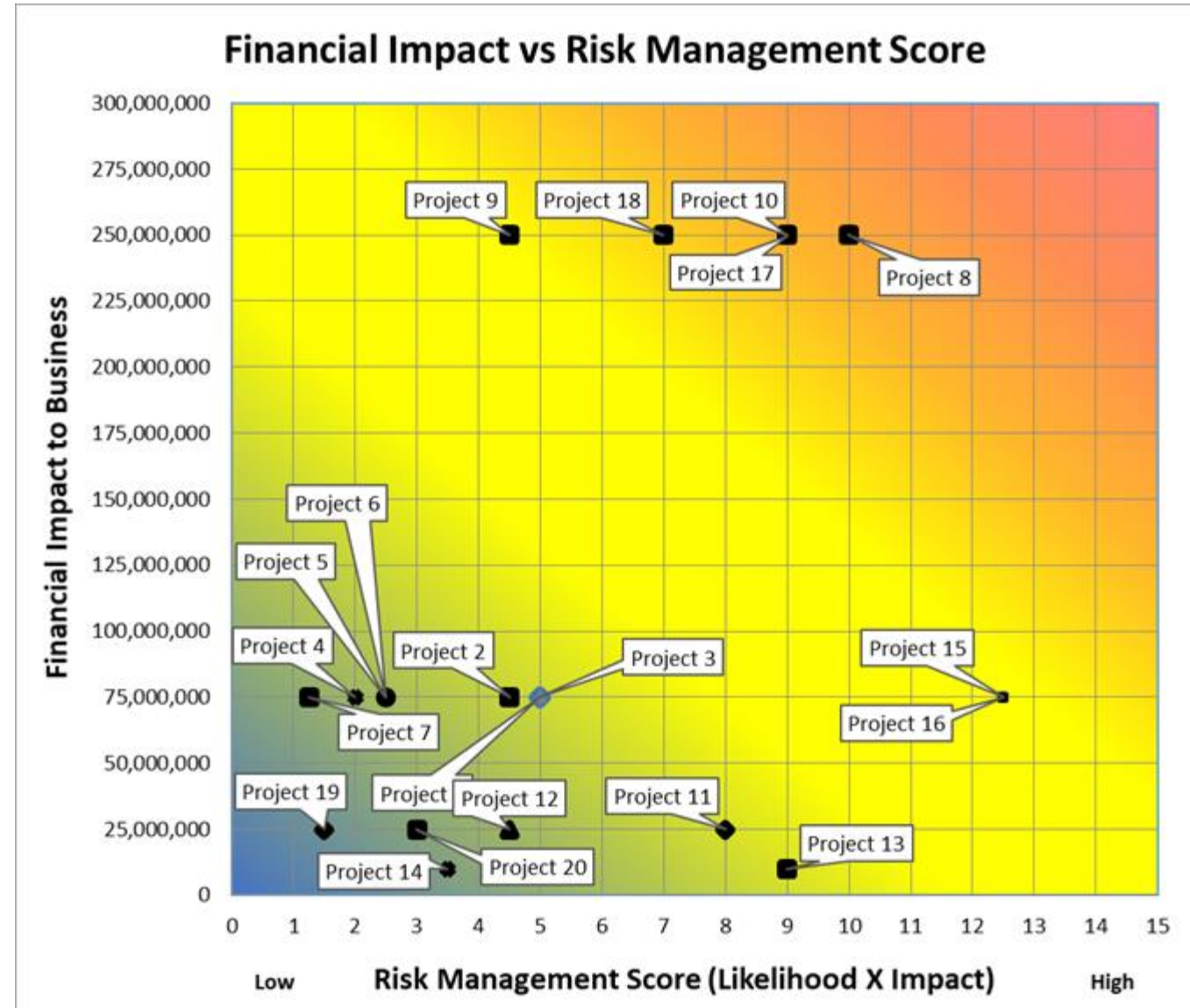




Quantifying the Financial Impact based on Risks

In addition, Miller and the IT staff were able to quantify the value of these risks and correlate the financial impact to the business. (refer to Addendum A)

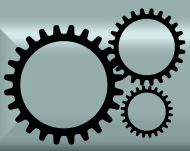
Risk = Risk Management Score X Financial Impact



The background features a series of interlocking gears of various sizes, rendered in a light gray color. A bright, glowing light source is positioned at the top center, creating a lens flare effect that illuminates the scene. The overall color palette is a range of grays, from light to dark, with the light source providing a focal point of brightness.

Solutions

Suggested Courses of Action



Implementation Recommendations

A Closer Look

Problem:

Manufacturing and shop floor systems are old and causing the production line to stop

Software implementation can be a lengthy upfront process, but the benefits it provides in the long run are worth the time commitment. HG will be investing money to gain efficiencies. Putting in the time to understand how a software system works, what features it has that HG can use will help to use it to its full potential and for business operations to reap the rewards.

Solutions:

Replace shop floor systems and establish redundant support systems, i.e. RAID and UPS

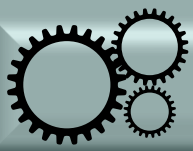
IT security analysts responsible for monthly audits of essential systems, and weekly audits of critical systems





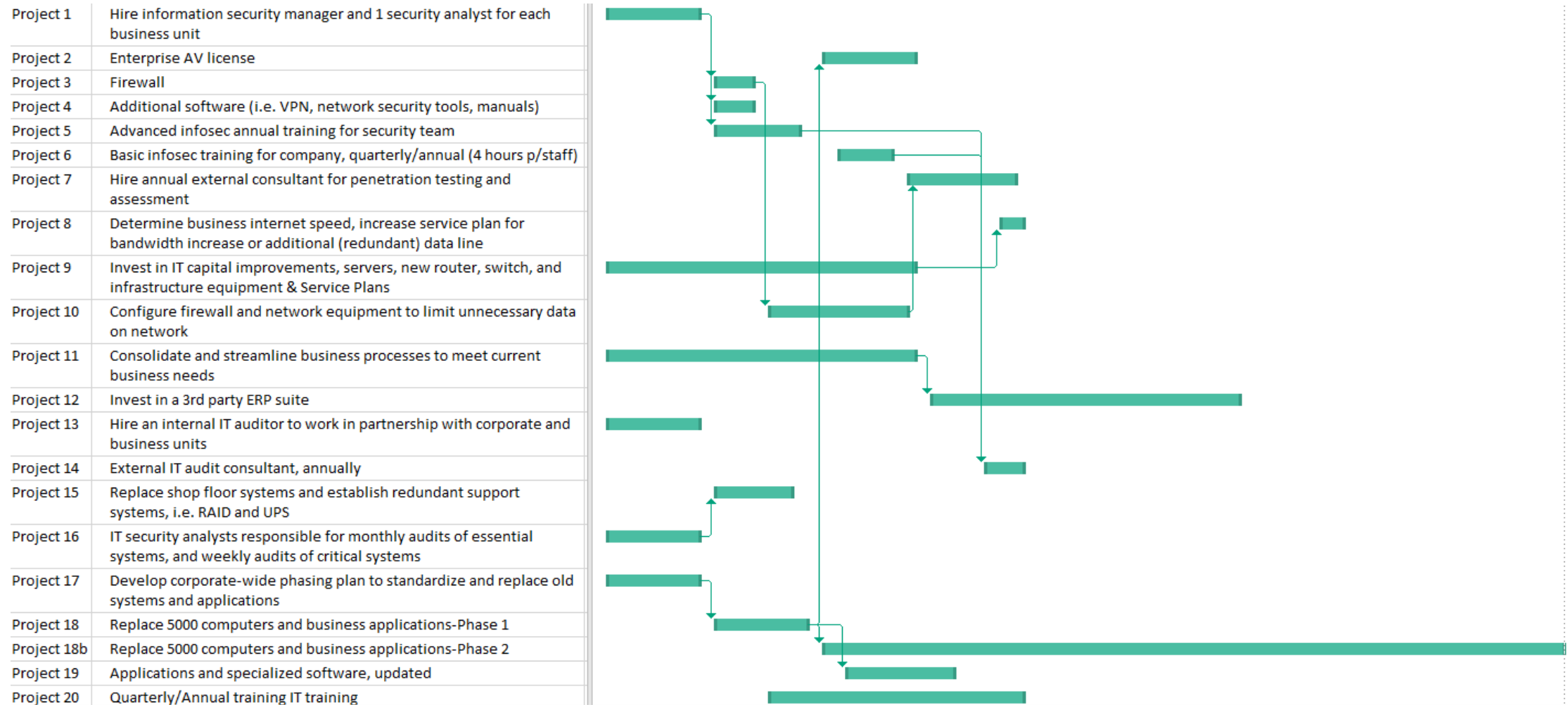
Timeline

Projected timeline of solutions



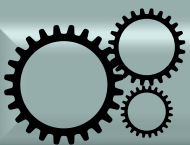
Information Technology Timeline and Milestones

This timeline represents the work that Miller will be doing in a 3 month timeframe. The duration of each project is based on realistic data, keeping the high priority items to start first followed by the supplemental tasks. Refer to Addendum B for more details.



The background features a light gray gradient with a subtle perspective effect, creating a sense of depth. In the center, there is a cluster of interlocking gears of various sizes, rendered in a slightly darker gray. A solid black horizontal line spans the width of the image, positioned below the word "Budget".

Budget



IT Department Budget

HG IT is seeking to align their budget as a percentage of business revenue to sustain current and future initiatives. With current performance and recognizing the importance of information technology investments, HG is allocating 2% of their revenue toward HG IT, amounting to \$180M annually⁸. Although this nearterm investment of correcting these initial issues will consume nearly \$28M of the annual revenue, HG IT is seeking to utilize the \$180M annual budget for a number of other projects.

This budget allocation is seeking to invest in business innovation, incremental business changes, and large investment toward business operations which drive production and revenue.

Following these initial project investments, Miller is seeking to address IT risk concerns within the industry, high frequency Help Desk issues as well as receive feedback from the staff to improve business performance.

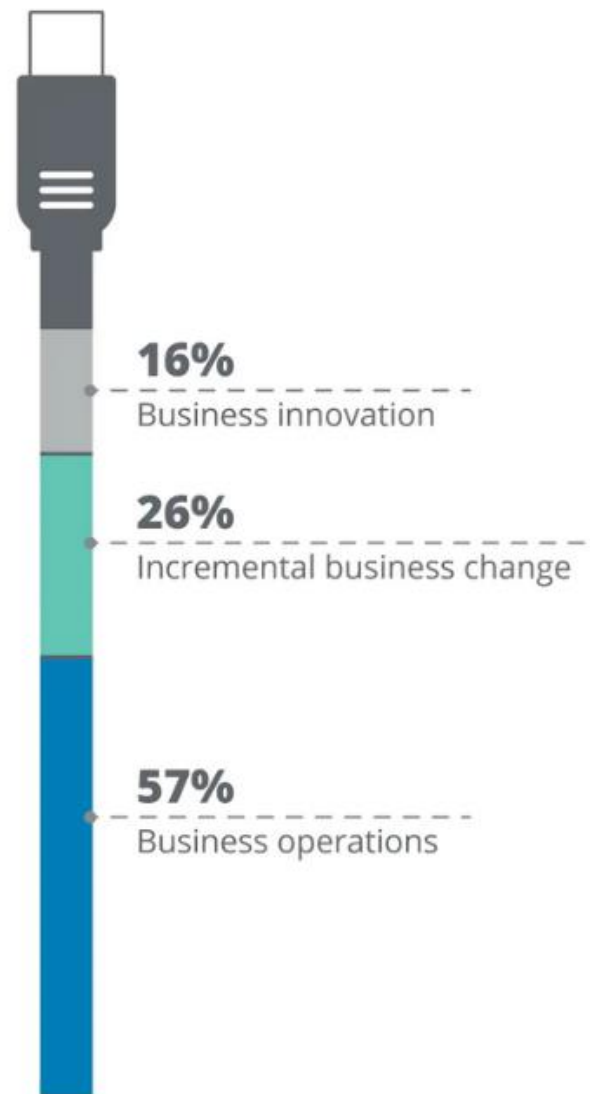


Image Credit: 2016-2017 Global CIO Survey, N=1,081

Types of Disruptions over the Past Four Years

Percentage of Respondents; Multiple Respondents allowed



Image Credit: Gartner, 2019

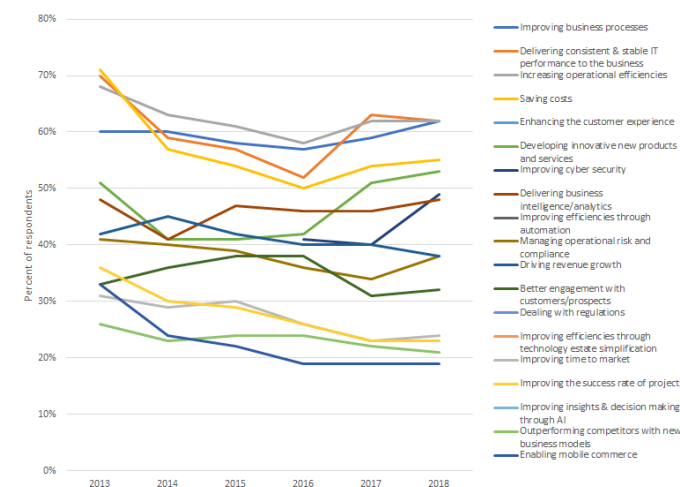
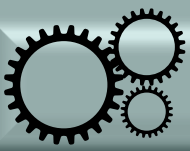


Image Credit: Harvey Nash & KPMG

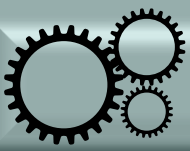
The background features a series of interlocking gears of various sizes, rendered in a light gray color. A bright, horizontal light effect, resembling a lens flare or a glowing beam, passes through the center of the image, creating a sense of depth and focus. The overall aesthetic is clean and technical.

Addendum and References



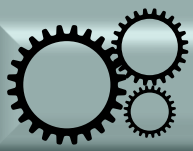
Addendum A

Project	Subcategory	Probability of Risk Occurance (H, HM, M, ML, L)	Impact (H, HM, M, ML, L)	Impact Occurrence Timeframe (N, M, F)	Risk Score	ALE Formula or Notes (ALE before - ALE after - Countermeasure = ALE Monetary Value)	ALE Before	ALE After (tolerance)	Annualized Loss Expectancy Monetary Value (Cost Benefit or Countermeasure)	Annual Cost to mitigate risk (Countermeasure cost)	CM Notes
No one is accountable for information security											
1	Hire information security manager and 1 security analyst for each business unit	ML	H	N	3.5	ALE before (greatest risk value; production system financial loss * 5 days * 3 systems) - ALE after (greatest risk value; production system financial loss * 1 day downtime * 3 systems) - CM	75,000,000	15,000,000	59,500,000	500,000	Manager and staff salary
2	Enterprise AV license	ML	H	N	3.5	ALE before (greatest risk value; production system financial loss * 5 days * 3 systems) - ALE after (greatest risk value; production system financial loss * 1 day downtime * 3 systems) - CM	75,000,000	15,000,000	59,900,000	100,000	Antivirus annual cost1, 2
3	Firewall	ML	H	N	3.5	ALE before (greatest risk value; production system financial loss * 5 days * 3 systems) - ALE after (greatest risk value; production system financial loss * 1 day downtime * 3 systems) - CM	75,000,000	15,000,000	59,850,000	150,000	750000/5
4	Additional software (i.e. VPN, network security tools, manuals)	ML	L	M	2	ALE before (greatest risk value; production system financial loss * 5 days * 3 systems) - ALE after (greatest risk value; production system financial loss * 1 day downtime * 3 systems) - CM	75,000,000	15,000,000	59,990,000	10,000	
5	Advanced infosec annual training for security team	ML	ML	M	2.25	ALE before (greatest risk value; production system financial loss * 5 days * 3 systems) - ALE after (greatest risk value; production system financial loss * 1 day downtime * 3 systems) - CM	75,000,000	15,000,000	59,991,781	8219	CM=(150000/365 * 5) * 4 personnel
6	Basic infosec training for company, quarterly/annual (4 hours p/staff)	L	ML	M	2.25	ALE before (greatest risk value; production system financial loss * 5 days * 3 systems) - ALE after (greatest risk value; production system financial loss * 1 day downtime * 3 systems) - CM	75,000,000	15,000,000	59,897,260	102740	CM=(125000 salary/365 days * .5 day training) * 600 personnel
7	Hire annual external consultant for penetration testing and assessment	L	HM	F	1.75	CM=highest value ALE-50000 (cost of cons) - int salary	75,000,000	123,288	66,438	50,000	Int emp salary \$150000
Connectivity is a problem											
8	Determine business internet speed, increase service plan for bandwidth increase or additional (redundant) data line	H	M	N	4.5	ALE before (avg annual wage * 50% less productive * amount of employees) - ALE after (avg annual wage * amount of employees) - CM	250,000,000	500,000,000	-250,012,000	12,000	avg annual wage 100,000
9	Invest in IT capital improvements, servers, new router, switch, and infrastructure equipment & Service Plans	M	M	M	3	ALE before (avg annual wage * 50% less productive * amount of employees) - ALE after (avg annual wage * amount of employees) - CM	250,000,000	500,000,000	-250,250,000	250,000	\$30 avg wage
10	Configure firewall and network equipment to limit unnecessary data on network	H	HM	N	4.25	ALE before (avg annual wage * 50% less productive * amount of employees) - ALE after (avg annual wage * amount of employees) - CM	250,000,000	500,000,000	-251,000,000	1,000,000	Network staff combined annual salary

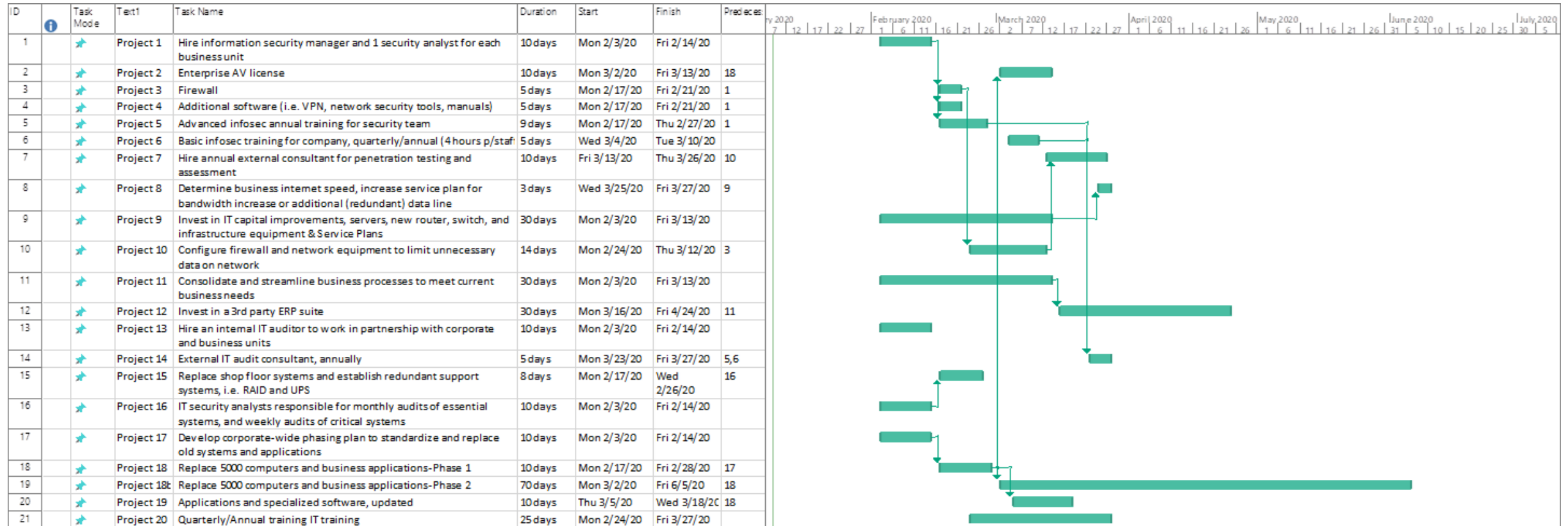


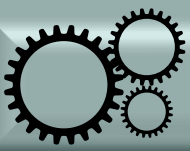
Addendum A

Project	Subcategory	Probability of Risk Occurance (H, HM, M, ML, L)	Impact (H, HM, M, ML, L)	Impact Occurrence Timeframe (N, M, F)	Risk Score	ALE Formula or Notes (ALE before - ALE after - Countermeasure = ALE Monetary Value)	ALE Before	ALE After (tolerance)	Annualized Loss Expectancy Monetary Value (Cost Benefit or Countermeasure)	Annual Cost to mitigate risk (Countermeasure cost)	CM Notes
There are too many ERPs and they are expensive to maintain											
11	Consolidate and streamline business processes to meet current business needs	HM	H	N	4	ALE before (avg annual wage* 50% less productive*amount of employees) - ALE after (avg annual wage* amount of employees) - CM	25,000,000	50,000,000	-25,037,500	37,500	500 Personnel, 3 weeks for planning
12	Invest in a 3 rd party ERP suite	M	M	M	3	ALE before (avg annual wage* 50% less productive*amount of employees) - ALE after (avg annual wage* amount of employees) - CM	25,000,000	50,000,000	-25,100,000	100000	200 p/user * 500 users
IT audit issues are piling up											
13	Hire an internal IT auditor to work in partnership with corporate and business units	HM	HM	M	4.25	ALE before (audit risk value to company) - no risk - CM	10,000,000	0	9,900,000	100,000	Salary
14	External IT audit consultant, annually	ML	ML	M	2.75	ALE before (audit risk value to company) - no risk - CM	10,000,000	0	9,980,000	20,000	Annual consultant cost
Manufacturing and shop floor systems are old and causing the production line to stop											
15	Replace shop floor systems and establish redundant support systems, i.e. RAID and UPS	H	H	N	5	ALE before (greatest risk value; production system financial loss * 5 days * 3 systems) - ALE after (greatest risk value; production system financial loss * 1 day downtime * 3 systems) - CM	75,000,000	1,500,000	73,495,000	5,000	Cost of system and redundancy
16	IT security analysts responsible for monthly audits of essential systems, and weekly audits of critical systems	H	H	N	5	ALE before (greatest risk value; production system financial loss * 5 days * 3 systems) - ALE after (greatest risk value; production system financial loss * 1 day downtime * 3 systems) - CM	75,000,000	1,500,000	73,200,000	300,000	Salary of IT staff
PCs and operating systems are old and unsupported											
17	Develop corporate-wide phasing plan to standardize and replace old systems and applications	HM	HM	N	4.25	ALE before (avg annual wage* 50% less productive*amount of employees) - ALE after (avg annual wage* amount of employees) - CM	250,000,000	500,000,000	-250,037,500	37,500	500 Personnel, 3 weeks for planning
18	5000 pc replacement	HM	HM	M	3.75	ALE before (avg annual wage* 50% less productive*amount of employees) - ALE after (avg annual wage* amount of employees) - CM	250,000,000	500,000,000	-251,800,000	1,800,000	5000pcs* \$800/5 year life exp + 1M contract for implementation
19	Applications and specialized software, updated	L	M	M	2	ALE before (avg annual wage* 50% less productive*amount of employees) - ALE after (avg annual wage* amount of employees) - CM	25,000,000	50,000,000	-25,050,000	50,000	Bus app cost, 500 special software users
No one understands how the applications and business systems work except the vendor											
20	Quarterly/Annual training IT training budget	ML	M	M	2.5	ALE before (avg annual wage* 50% less productive*amount of employees) - ALE after (avg annual wage* amount of employees) - CM	25,000,000	50,000,000	-49,000,000	24,000,000	Avg hrly wage*5000 staff*16hrs



Addendum B





References:

1. COBIT® 5: Enabling Processes. Rolling Meadows, IL.: ISACA, 2012.
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6. Lavanya, N. & Malarvizhi, T. (2008). Risk analysis and management: a vital key to effective project management. Paper presented at PMI® Global Congress 2008—Asia Pacific, Sydney, New South Wales, Australia. Newtown Square, PA: Project Management Institute.
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