Business Case for Top Gear Bikes's ERP implementation initiatives

Prepared for:

The TGB IT Evaluation Committee

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Delivered on:

October, 09, 2023

PREFACE

To ensure the success of this ERP project, this document — prepared for TGB Board of Directors — is written to:

- Present the recommendations of ERP system with our research findings
- Assess the business value of the proposed solution
- Provide the justification based on the current situation
- Describe the implementation and financial of the proposed solution

1. INTRODUCTION

Top Gear Bikes (TGB) is a medium-sized organization specializing in manufacturing and distributing racing bikes. Since the company's establishment in 1989, its business processes have not changed much, and it has been using legacy systems that were specifically built for the company. However, as the market has evolved considerably, and the organization realizes that its systems and processes lack the agility to be competitive in the modern market, the Board of Directors and CIO would like to implement an Enterprise Resource Planning (ERP) system.

The current systems have two critical weaknesses that the business aims to overcome with the new ERP implementation. Due to its nature, legacy systems fail to provide relevant and correct data in a timely fashion. Because of this lack of real-time data, TGB's top executives and middle managers are unable to make informed decisions. Hence the business becomes less competitive. Moreover, TGB's leaders also suspect that the legacy system will not be able to handle the expansion of business operation into Asia (Vietnam, India, and China) in the future. The company is considering importing raw materials and sub-assemblies from China, Vietnam, and India and offshoring some of its manufacturing. Therefore the business wishes to manage its Supply Chain better, especially Inventory Management and Manufacturing Management.

The Business Case aims to research, justify and recommend a suitable ERP system that aligns with TGB's business objectives and helps them grow and become more competitive in the market. The report consists of analyzing the business objectives, evaluating different ERP systems, and proposing a brief implementation plan for the suitable ERP system. Hopefully, the business will be equipped with enough information and able to implement the ERP system successfully.

The document structure is divided into 10 parts with some key takeaway:

- Optimising inventory management is one of the four business objectives (Section 2).
- The problems of aged process and system and opportunities for TGB's current situation (Section 3).
- 6 factors are critical to the project which should be used as constraints.
- SAP S/4 HANA is recommended as the ERP solution (Section 5).
- We think that SAP S/4 HANA could support the business needs as project requirements (Section 6).
- Financially, this project will give 1.49 % of ROI (Section 7).
- The project should at least last for 149 days (Section 8),
- Poor Communication Management is the top risk as it is mostly like happened with the greatest impact (Section 9).

The document also includes a section for Exhibits (Section 10) that will support the analysis and evaluation.

2. BUSINESS OBJECTIVES

Four core outcomes that Top Gear Bikes (TGB) plan to achieve through the implementation:

- **Better customer management.** The system will enable and enhance the online customer

order transparency, such as information about the relevant customers and products. The company aims to use transparency to coordinate all the company's dealers and provide better support to them.

- **Optimise inventory management.** The system can manage Vendor inventory stocks online. With this new functionality, the company aims to achieve an optimal control of their demand and inventory management.
- **Enhance manufacturing management.** The system will be able to work globally in countries that the operations will expand into, such as Vietnam, India, and China. This expandability will enable the company to seamlessly track the profitability and manufacturing costs of all product ranges in different branches/countries.
- **Enhance business decision making.** The system can provide the company's remote Business Area Sales Managers a real-time interaction with their ERP system. The company aims to assist its managers in performing better predictive analytics. The improved analytics will support strategic planning (e.g., increase market share, profit maximisation, etc) and decision-making processes more effectively.

Therefore, this implementation could be beneficial for suppliers, customers, and manufacturer by increasing cost effectiveness and visibility of order as well as enhancing inventory management and business decision making.

3. CURRENT SITUATION AND OPPORTUNITY

3.1. Problems that TGB are facing

A variety of legacy systems that were built specifically for the company and business process have been used since 1989 for TGB; they adopted a functional business model for their information and material flows. This has functioned well for decades because the process worked well with the system in early days. However, in the era of globalisation, the competition is no longer regional and companies have to be agile to adopt the market change. And the current systems have been working in silos in which the exchange of information between operating groups (e.g., area of manufacturing and finance) is handled by the top management.

As such, without the information being knowledgeable across different function areas, this implementation poses some challenges, and it could hardly align with the business strategy (i.e., saving manufacturing cost, stay competitive, and maximising profits). We provided the consequences of using the current implementation below:

First, the current implementation could not seamlessly track profitability and manufacturing costs of all their product range. For example, due to economies of scale, TGB is considering an offshore manufacturing or material procurement in countries like China and Vietnam which has a time difference; however, the unintegrated system might not be able to provide relevant and correct data in a real-time manner. Therefore, without seamlessly tracking profitability and costs, TGB is hard to measure which parts of inefficient process cost the most and costs could not be optimised.

Second, TGB could not stay competitive. The functional model limits the information flow among the process because it is top-heavy (Monk & Wagner, 2012). That is, when information only controls by a handful of people in organsiation and data is not provided in timely fashion, the staff could not make effective decisions to react quickly to change.

Third, TGB could not maximise the profit. The above mentioned that the legacy systems follow an obsolete business process and information flow. The data produced by systems are not informed in a timely. This limits the potential growth of TGB without being competitive (e.g., finding a new demographics of customers) and makes top managements hard to make critical decisions (e.g., how to re-engineer their current business process). Therefore, TGB is encountering the hindrance of profit maximisation.

3.1. Opportunity that TGB can seize

Since the current systems could not support the strategies mentioned above, the situation offers an opportunity for system upgrade. Finding a right ERP system could help TGB stay competitive, fend off threats from disruptive forces, and improve overall enterprise efficiency by improving the current business process.

Trek bicycle — TGB's biggest competitors — proved this point: they had been leveraging Oracle's Netsuite eCommerce system (Oracle, 2022) and Microsoft CRM system (Microsoft, 2022). The information flow of these ERP systems followed a process business model, embracing flexibility and rapid decision making. In 2021, Trek bicycle's revenues increased to $900.0 million (Pang, 2022) by leveraging these up-to-date systems with emerging technologies such as AI, Machine Learning, IoT, Blockchain, Autonomous Database. So, when a digital transformation project is done properly, companies could use the system to understand customer preferences better, match the demand, and hence gain competitive edges.

4. CRITICAL SUCCESS FACTORS AND CONSTRAINTS

To successfully implement its new ERP system, there are 6 critical success factors that TGB should carefully examine and pay attention to. Firstly, because this implementation involves re-engineering the business processes, IT systems and business strategies, it is crucial for the top management to be committed to this project. Without constant commitment and support from the top management throughout the whole process, any project is doomed to fail. Especially projects that have a critical impact like the implementation of a new ERP system, where a lot of structures have to be re-engineered. Due to its complexity, this implementation will also require exhaustive visioning and planning from the organisation. The implementation aims to build a foundation for new business processes and systems and the organisation's goal to expand to other countries, it cannot be stressed enough to plan the whole project carefully and effectively. For the same reasons, project management and change management are also other critical success factors that TGB cannot ignore. Without proper attention, the transition will fail and cost the organisation a lot of time, energy and money. From a technical perspective, data management also plays a crucial role in ensuring a smooth transition from the legacy system to the new system. It ensures the essential data imported to the new system will be reliable and not be duplicated. After the implementation is finished and reviewed, the end users must receive extensive education and training since the system is new and unfamiliar. Without proper user training, the systems and business processes will not function well. Hence TGB should educate its employees to use the ERP system to its full potential. As long as TGB pays attention to these critical success factors, the implementation is set up for success.

5. ANALYSIS OF OPTIONS AND RECOMMENDATION

There are four potential options that TGB could consider for their new ERP system: 1) SAP S4 HANA, 2) Oracle NetSuite, 3) Sage Intacct, and 4) Microsoft Dynamics 365 Business Central. The four products fulfil the business objectives. They can enable the organisation to have better customer management with their CRM feature, improve business intelligence with real-time interaction and enhance the supply chain management with efficient inventory and manufacturing management features. TGB could consult Exhibit B for a more detailed description of each system, and its strengths compared to others.

However, as recommended by Jason and David, overall, SAP S4 HANA and Microsoft Dynamics 365 Business Central are preferred over Oracle NetSuite and Sage Intacct. As mentioned in the Exhibit B, even though Sage Intacct has better ratings than Business Central, Sage Intacct is more specialised in accounting and focuses less on Supply Chain Management. Therefore, David recommends Business Central over Sage Intacct. And even though SAP S4 HANA is more costly than Oracle NetSuite, choosing the former could be more beneficial

in both short and long terms.

After careful comparison between the two preferred options, SAP S4 HANA is concluded to have several advantages over Microsoft Dynamics 365 business Central such as future system integration, business intelligence tools and user ratings.

SAP S4 HANA integration will likely work well with a wider range of systems than Business Central. As Business Central is a product of Microsoft, it will work best in a Microsoft ecosystem compared to other vendors. Both SAP and Microsoft will need some sort of data processing before they can use information from other systems or applications, however, since SAP is an ERP system that is built to integrate with other vendors' software (Kamper, 2021), it will be easier to build a diverse ecosystem with decent process efficiency. While Business Central may require a full Microsoft environment to achieve the same or better performance, which may inccur a higher initial investment cost. Therefore, once SAP is integrated into the ecosystem, it enables the ecosystem to expand in the future.

SAP S4 HANA could offer a better deal for the business intelligence tool as well as advanced technology for better competitive advantages. As a result of the research, it is suspected that Trek (TGB's rival) is using either NetSuite or/and Microsoft Dynamics for their ERP system (Bicycle, 2022). Using this information, TGB could negotiate with the SAP vendor for a better price. Moreover, according to the Butsmann (2022), SAP is advancing towards a better Digital Assistant and Chatbot. The improved Conversation AI platform aims to provide a better user experience and help the Business Intelligence process work seamlessly.

SAP S4 HANA has better customer ratings compared to Microsoft 365 Business Central. According to research on various sites such as g2.com, gartner.com and trustradius.com, SAP S4 HANA is reviewed to be a better software overall. As both software provides the same services, TGB should opt for the system that is preferred by many other users.

In conclusion, **SAP S4 HANA** is preferred to be TGB's new ERP system.

6. PRELIMINARY PROJECT REQUIREMENTS

To conclude this project a success, the SAP S/4 HANA — chosen ERP system — should have these core functions:

- Providing the module of Customer Relationship Management (CRM) to enhance the organisation's customer management process
- Providing the organisation with an advanced Business Intelligence tool across all different modules (e.g., FI) that allows managers to interact in a real-time manner with the system
- Providing effective Supply Chain Management features (SCM) (Inventory management (IM) and Manufacturing management (MM))

Besides the core features, the ERP system should satisfy some extra but essential requirements such as scalability, easy integration, ease of use, reliability and good customer support, etc.

7. BUDGET ESTIMATE AND FINANCIAL ANALYSIS

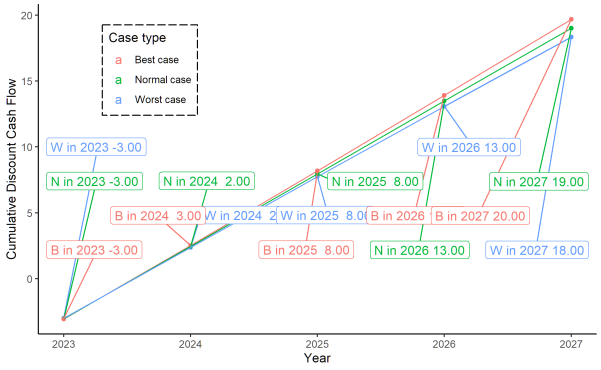

Figure 1: NPV projection in using SAP S/4 HANA for the upcoming 5 years.

We expect the Return on Investment of using SAP S/4 HANA for the upcoming 5 years to be 1.50% for the best

case, 1.49% for the normal case, 1.47% for the worst case. This can be seen as beneficial in mid term already, as the ROI returns possitive straight after second year. In the fifth year, the NPV is already nearly twice of the investment amount; therefore, we can foresee the ERP project would benefit TGB in long term too, in terms of financial performance. Further detail of the calculation could refer to Exhibit C

8. SCHEDULE ESTIMATE

Table 2 shows the estimated time required for the project. We included five major milestones, and the time estimation is suggested by Monk and Wagner (Monk & Wagner, 2012). We assumed that the started date is 1 January, 2023. The estimated date means the day on which the milestone should be completed, and the calculation is based on average days of time estimation.

9. POTENTIAL RISKS

We analysed eight major risks in Exhibit D with a risk register, top four of which are summarised below:

1. Poor Communication Management

This risk currently is the one most likely to happen and its impact is severe. As TGB aims to implement the new system at the same as expanding to other countries (China, Vietnam and India), the implementation becomes more complicated. Due to many reasons such as time-zone differences, language barriers and etc, communication between managers is very likely to be disrupted or inefficient. Without proper communication management, all level managers could fail to receive crucial information timely, hence delaying making useful and timely business decisions. Not only can inefficient communication prevent the successful implementation of the ERP system, but it can also sabotage the organisation's business processes. Hence, its severity is high.

Potential mitigation could be implementing an open forum for internal employees (Chen et al., 2009). Not only does it bridge the communication and objective

Milstone	Description	Time Estimation (Days)	Estimated Date
Project Preparation	After technical and business teams are organised, they come together to define the system landscape, scope and objectives. Then they select hardware and system vendors.	15-20	19/1/2023
Business Blueprint	Produces detailed documentation of the business process requirements of the company	25-40	21/2/2023
Realisation	Project team members work with consultants to configure the ERP software in the development system	50-80	27/4/2023
Final Preparation	Testing the system throughput for critical business processes.	35-55	11/6/2023
Go Live and Support	Before system rollout, these duration needs to go through 1) configuration of help desk for end-users; 2) data migration and system integration; and 3) conducting end-user training. Then, they define the dates of going live, and project completion. Finally, they conduct PIR monitoring system performance and see if satisfactory.	24-30	8/7/2023

Table 2: Schedule estimate for TGB's ERP system going live.

gaps among stakeholders (e.g., TGB's manager, contract workers, and end-users), but also it ensures issues and priorities could be expressly discussed, thereby preventing paralyse in communication. The forum could also have an anonymous function so employees will feel safer expressing their thoughts and opinions on certain issues.

2. Poor Change Management

This risk ranks second highest in the risk register due to its likelihood and severity. Since this is the first time TGB implements an ERP system, the organisation is inexperienced and likely to make mistakes in its transition from the legacy system to the new system. Therefore the organisation should be extra-cautious when managing and planning the changes in the organisation. Moreover, poor change Management can also have a severe impact. Because TGB is re-engineering many of its business processes, IT systems, and business strategies, a fatal mistake could cause a breakdown from the inside of the organisation.

To avoid the worst outcomes, TGB could consult The principle of Kotter's 8 steps (Kotter, 2011). This reference could guide the TGB executives towards smoother change management.

3. Poor Project Management and Risk Control

Project Management and Risk Control are always likely to happen and have extreme severity. If TGB fails to properly manage the project and keep the potential risks under control, the implementation of the ERP system is doomed to fail. The failure will cost TGB a large sum of budget and time and potentially disrupt their business processes (which will cause even more). Therefore, TGB must ensure their project manager (PM) is suitable for implementing a new system into the organisation.

As the PM can be inexperienced with ERP system implementation projects, they should be extra careful in assessing risks and managing the project. As mitigation, if necessary, TGB should hire ERP experts to give the PM more insights about the new system, thus they can manage the project more effectively. Otherwise, as long as the PM adopts a formal method of assessing risks, such as developing a list of performance metrics in TGB, considering how to measure them, and obtaining regular performance measurements (Chen et al., 2009), the project should be under control.

4. Poor Integration Management

Integration Management is another risk that TGB should pay attention to. Because the organisation is trying to integrate a new ERP system into an old and customised legacy system, the complexity of the transition is high. Without fully understanding the old and new systems, the integration will encounter some roadblocks such as data duplication when migrating data from the old system to the new one. Not only will the obstacles delay the implementation, but they will also disrupt multiple business processes, which could cost the organisation its time and money.

As a mitigation, the managers need to carefully examine the legal systems and how the ERP system could be integrated into them. Besides the pre-implementation examination, the managers should also do a post-implementation review carefully (Aloini et al., 2007) to ensure everything is set up correctly and performs as intended.

10. EXHIBITS

Exhibit A: Critical Success Factors (CSF) for a successful ERP implementation

Following is the analysis of the six critical success factors (CSF), three of which ***(i.e., CSF1, CSF2, and CSF3)*** were performed by *Jason Siu* and the rest ***(i.e., CSF4, CSF5, and CSF6)*** were carried out by *Ke Ly Duong*.

CSF1: Extensive education and training

Adequate training is vitally important. In ERP implementation project, in spite of the willingness to spend millions of dollars and hundreds of hours, companies skimp on employee training adequately (Al-Mashari et al., 2003); this is a common mistake that lots of companies make (Gupta, 2000). TGB's personnels possess various levels of computer literacy (i.e., experienced users, inexperienced core users,

inexperienced casual users, and users requiring simple system awareness.), and it is detrimental if they are unskilled. For example, the change of the system implies that the way of inputting data is changed; if the users are not well-trained in TGB, chances are that data (e.g., routing capacity, bill of material, lead-time, resources to be allocated, manufacturing plant, inventory need, etc) would be misinputted. In mid-long term, as these incorrect data accumulated, the other useful information (e.g., demand forecasting) would be perceived incorrectly too. This will defeat the purpose of having an ERP system — which is to drive up profit, increase process efficiency, and strengthen competitive position. So, even a skilled user requires some degree of training due to the changes in the procedures and new way of inputting the data. This factor ensures all TGB's employees understand their impact on using IT system towards the business objectives.

In particular, companies spending less than 13% on training and education are three times more likely to fail ERP implementations (Monk & Wagner, 2012). So, Gartner Research recommends one should allocate at least 14% of a project's budget to education and training, the cost of which could include on-the-job training with materials about the ERP system (e.g., step-by-step manuals) and a two-to-three-month course of introducing to all users of the system and explaining the changes and new procedures, and how the data controlled by employees affect the entire business operation. This could boost the chance of success to 80% (Volwer, 1999). Therefore, having an adequate training is important, otherwise full benefits cannot be realised by TGB's employees.

CSF2. Top management commitment

Having the involvement and support of the top management is seen as the most essential factor of ERP implementation (Ngai et al., 2008). HP considered that ERP implementation is about people, not processes or technology (Al-Mashari et al., 2003). When an organisation embarks on ERP implementation, it brings a pervasive transformation for users of the system and other stakeholders, whether they are end-users or not. An example of the change for TGB's users (i.e., 80% of TGB employees) might need to adopt the new system (e.g., new way of data entry, making reports, changing existing business processes, etc.). While such a process change could bring organisational benefits, it could bring organisational disaster without top management's meticulous plan. Because people resist changes for many reasons (e.g., Ripple effects, Past resentments, etc) (Kanter, 2012), it can trigger political conflicts between various interest groups. Therefore, management has the responsibility to resolve and mediate them (Juma, 2016).

A successful implementation entails provision of required resources for the implementation, strong leadership, commitment, and participation by top management. Another example of the change is for non-main users (i.e., 20% of TGB employees): During the 'go-live' weekend which is a critical time-point, Umble (Umble et al., 2003) pointed out that the physical reorganisation of the manufacturing plant (e.g., relocation of the machines) were required. TGB's managers (i.e., 2.5% of the employees) needs to prepare with extraordinary dedication, effort, and ability to facilitate such a transition. Therefore, as an ERP system roll-out span divisional boundaries and affect different stakeholders in an organization, the effective change management from top is critical; not only they need to constantly monitor the progress of the project and provide direction to the implementation teams, but also they need to harness the energy and creativity of employees. Rabaai (Rabaai, 2009) mentioned that top management needs publicly and expressly to identify the project as a top priority.

CSF3. Visioning and planning

While IT strategy plays an important role in organisation in supporting business objectives, executives should not blindly hope that the new ERP software will solve fundamental business problems that are irremediable by any software. TGB's business process has been operating for more than 35 years, so some core parts of it might be obsolete and invite fatal flaws. As such, executives should determine if TGB is willing to change its business flow to fit the software, or the other way round. And ERP implementation was deemed technological, business, and organisation-wide project, rather than a solely IT project; therefore, both business strategy and technology strategy are equally important

(Al-Mashari et al., 2003).

Executives should consider how re-engineering to a single information system for all sites of TGB organisation would yield what kind of transformation, and consider if they are in sync with business objectives. For example, when TGB leveraging ERP system, they can redesign the manufacturing blueprints by incorporating their potential offshore site (i.e., China and Vietnam). Such process re-engineering could improve the business performance and save the cost of manufacturing — which meets the third and fourth business objectives.

With above said, having a clear defined vision and the formulation of the strategy can lay out the blueprints of success for the implementation.

CSF4. Data management

Despite not being frequently mentioned in the literature, data management is critical in many ERP system implementations. For TGB's situation, since the organisation has specifically built systems for itself, the data structures and formats may not be suitable for the new ERP system. Without proper data integration and care in the legacy system transformation process, the implementation is set to suffer severe problems. For example, a mismatch in the demand planning process could happen without appropriate data processing, causing oversupplying or undersupplying in the supply chain. Additionally, poor data management and data validation could also result in duplicate orders, which potentially costs the business good fortune. Furthermore, to prevent data loss in data migration and system transformation, TGB should also back up its data and have it ready to be used in case any problems arise. With proper data management and preparation, not only will the organisation ensure the business processes run smoothly, but the managers are also guaranteed to have reliable and accurate data to make effective and informed decisions.

CSF5. Project Management

The importance of project management in organisations cannot be overstated. If TGB manages their project well, every part of the business run more smoothly. A well-managed project will save time and money for the organisation. With the right planning of the project's journey and the milestones, employees can allocate the resources more efficiently and know what tasks to prioritise and avoid delays and overspending. It will also enhance internal communication. Because more efficient project management means reducing the complexity of collaboration, increasing transparency and ensuring accountability, even when you are working across teams or countries in TGB's case (Teamwork, 2022). Moreover, by monitoring carefully how the project is progressing, the managers can get a deeper understanding of where resources are being spent, what needs to be prioritised and what risks may happen. Hence they can make more decisions that benefit the organisation. Therefore, TGB should aim for a well-managed project as it will allow the team to focus on the work that matters and be free from the distractions caused by problems that arise during the project.

CSF6. Change management

If TGB wishes to successfully integrate a new system into their structure, the team must carefully manage the changes. Change management is essential since it requires the firms to look at a variety of factors that might impede a successful ERP implementation. For example, without proper change management, users of a new ERP system will not receive adequate training to use the new system effectively and efficiently (Schniederjans & Yadav, 2013). Effective change management also provides the higher-ups about cultural readiness and what strategic initiatives should be carried out to ensure the transition proceeds successfully (Motwani et al., 2005; Schniederjans & Yadav, 2013). For a successful ERP implementation, the higher-ups must ensure the employees have proper training and understand the purpose of the new system. With proper aid from the organization, the revolutionary change will not scare the employee nor leave them confused and dissatisfied (Motwani et al., 2005). Another aspect of change management is to maintain effective enterprise-wide communication. It is advised that strong communication throughout the various stages of the implementation will help employees to understand why change is necessary, how the implementation is going and the benefits changes will bring (Dezdar, 2012). By managing changes properly, the ERP implementation will carry out smoothly.

Exhibit B: ERP recommendations

Following is the analysis of the four systems we selected, two of which ***(i.e., SAP S/4 HANA and Oracle NetSuite)*** were performed by *Jason Siu* and the rest ***(i.e., Dynamic 365 and Sage Intact)*** were carried out by *Ke Ly Duong*. The comparative analysis was given followed by the analysis of each system.

Option 1: SAP S/4 HANA

SAP ERP software has arguably the richest features and is comprehensive for businesses. As the market leader in ERP software, SAP S/4 HANA is dubbed as one of the most competitive products in the market (Networkers, 2017). The following explains the advantages and disadvantages of using this system, and how the system serves the TGB.

Alignment with business objectives

The first benefit of using S4 HANA is its rich feature. It has 14 types of functional modules (Gowda, 2022), including:

1. Planning maintenance (PM);
2. Production planning (PP);
3. Finance (FI);
4. Controlling (CO);
5. Sales and Distribution (SD);
6. Customer relationship management (CRM);
7. Supply chain management (SCM);
8. and Material management (MM)

These modules are tightly coupled and comprehensively cover most business functions needed for all sizes of corporations, including TGB. The system can support the four TGB's business objectives.

First, the modules of PP, SCM and MM allow TGB to shift their manufacturing line offshore. This is because these modules are integrated with all transactions standardised all over the world. And the system is able to capture process and material information precisely and in detail. Along with the FI module, TGB management could mange their financials more easily.

Second, other modules (e.g., SD, CO, etc) could significantly help TGB to optimise inventory management. S/4 HANA is able to track and control inventory and stock quantities and to facilitate a streamlined material flow across all inbound and outbound logistics operations (SAP, 2022). For example, it can post goods receipts for inbound deliveries and goods issues for outbound deliveries, forecast the demand and Monitor inventory operations in real-time.

Third, S/4 HANA ensures order transparency. The functions run in the modules are kept directly in the SAP HANA database; therefore, compared to the current system, S/4 HANA eliminates data replication and reduces the company's operating costs. Consequently, the customer receives a simplified environment, visualises their order status easily, and hence the customer is better supported.

Lastly, the system enhances business decision-making through its advanced analytics. The name HANA stands for High-Performance Analytic Appliance. Self-explanatory, the platform has a more advanced analytic capability. Across all modules, user-like managers can customise a dashboard to gather useful insights. For example, the unique function of S/4 HANA is its real-time intelligent analysis leveraging AI and machine learning capabilities. Also, 13.61% of the market share with three Business Intelligence (BI) products proved that SAP is the market leader in BI (Slintel, 2022). Managers could take this as a competitive edge and get a more accurate forecast from this predictive analytics technology, thus better supporting strategic planning and decision-making.

Technical capability

SAP S/4 HANA is highly capable, given that it yields 24.3/25 in our scoring model. It has a robust performance (4.4) and ease of use (4.25) using SAP

Fiori. A robust system is important because it needs to support multi-national operations for TGB, and since there are various levels of computer literacy for TGB's end users, a simple-to-use system can save their time and cost in training and learning.

However, in terms of integration, it might be harder for TGB to integrate with S/4 HANA. TGB currently is using in-memory database while S/4 HANA has an in-memory database. While it might be hard to fit all TGB's data into their database structure, using such a database architecture has its own benefits. We suggest that the timeline should be set longer for data migration since the compatibility between old and new systems might be clunky.

User support is extensive

User support is highly scored (4/5) because of its comprehensiveness. First, SAP itself offers a wide range of training, certificates, and education related to different modules of S/4 Hana (Sap, 2022). Second, a credible source who worked in a large-size enterprise (Firm size: 3 Billion - 10 Billion USD) invited by Gartner had done a peer review on this system, and one thing that the support team from SAP is extremely knowledgeable. They can open a high-priority ticket for critical issues, and the team will resolve it the same day. So, the quality of technical support is of quality and the timeliness of vendor response is fast. Third, there is a large spectrum and group of peer communities online. Accountable sources could be verified via SAP's approval. And people could share the issues encountered and the resolution. So, given the resourceful knowledge, the online community could be a factor to use this system.

Financing requirements are high

SAP's fee could be as high as multi-million so it is notoriously high (Advantage, 2021). Therefore, the rating we gave was not as high (3.4/5). The system is the most expensive in the product catalogue with various fees (e.g., license fee, maintenance fee, etc) (Flanagan, 2021), and implementation services are extremely costly. The price of the system is not transparent. Being a leader in the market leaves SAP a higher position in negotiation, so the price flexibility is not as high. So, without a huge budget, TGB as a medium-seize enterprise might need a better alternative.

All in all, S/4 HANA fits the business requirements and technical requirements of what makes a good ERP system. But the concern — which is the most important one — is how much TGB wants to commit. If the top management thinks an ERP can benefit in long term and is willing to invest, this is a great option.

Option 2: Oracle Netsuite

If S/4 HANA is the flagship product for SAP, then NetSuite is Oracle's version. However, what makes NetSuite different is its targeted demographic; it cates to traditional manufacturing companies with small-to-medium size — who do not need much marketing and HR modules. It is a flexible, customisable and integration-ready suite to streamline their business operations.

Technical capability

The system is flexible (4.5/5) because of 2 reasons: First, the scalability is extremely high. For example, the automation is modular and incremental (NetSuite, 2021), and the integration of existing software suites is integration. Second, NetSuite has data centres that are configured to accommodate surges and spikes in usage and to scale to address increased volume and transactions. They have more than 32,000 customers with billions of customer requests per month (NetSuite, 2022a), so their performance flexibility is well-known, hence rating them as 4/5. For these two reasons, NetSuite is more adaptable for medium enterprises like TGB.

Better data management

Not only they are using a unified database, as a vendor offering Database services, but also their database is known as the industry standard. As such, when using the services of NetSuite, their policy on data management, operational security, and application security is in the industry standard too.

Also, their data backup is comprehensively served. For instance in disaster recovery, the data in the primary data centre is replicated and synchronised across data centres offsites globally under almost any environmental conditions (NetSuite, 2022a). So, having reliable data management processes is important for business processes as data is seen as an asset.

Pricing is flexible

As TGB is expanding their business, money will go to different types of investments like expanding the manufacturing lines. Having a reliable system at a good price is of priority when selecting an ERP system, and NetSuite is well-known for its economical prices. We rate 4/5 for pricing flexibility because of its pricing transparency. The large vendor like SAP do not disclose their pricing scheme, however, NetSuite pricing includes a $999 monthly licensing fee, plus a per-user fee that starts at $99 a month. The cost could vary by size, but as TGB business is booming internationally which anticipates a need for an ERP platform to manage everything, NetSuite is a great SaaS solution.

Reporting capabilities and ease of use

As TGB is using a data-driven approach to enhancing decision-making, a great dashboard and report are important. Reporting capability is not perfect. One credible source from Gartner (Insights, 2022) — who is working in a 250M - 500M worth company — mentioned that they have the challenge working with large data (i.e., Around 1 million transactions a month). NetSuite doesn't work well-generating reports for that much data, and TGB can take note of that. However, despite not being perfect for the case, its BI tools have a 4.7% of market share (Slintel, 2022) which shows that it is a market leader. The dashboard itself with the advanced data representation is real-time and should not be a problem for TGB. If TGB wants to catch up with the competition and wants to get more advanced reports, NetSuite is an option.

SAP S/4 HANA versus Oracle NetSuite

Although choosing SAP S/4 HANA requires a slightly higher budget than NetSuite, given that the current systems have been sitting in over years — it is a high time for a big change. And we recommend SAP S/4 HANA for the following two reasons — which will be beneficial in both short and long term:

1. **The flexible and comprehensive modules are more aligned with TGB's Business Objectives.**

In short term, the comprehensiveness of the modules offered in S/4 HANA could cater the exact need when TGB is looking to expand their business, such as outsourcing their materials, offshoring their manufacturing lines, and optimise inventory management. Because there are more modules than NetSuite which covers most of the business functions, all these strategies could be effectively managed when using S/4 HANA.

In long term, the flexibility gives an ease to TGB when expanding their system. The benefits of SaaS solution is that TGB only pays as much resources as it needs. The current scale of TGB is considered a med-sized enterprises, however, as we are expanding the business globally, maybe needing to acquire other businesses, and increasing our competitiveness, it is highly likely that the size will be boomed to a larger scale.

As such, we might need to expand the system and/or changing new business models by using more modules in the future. And when we use S/4 HANA with five modules modules, let's say, it saves our costs to integrate more modules that seen as irrelevant-but-important. For example, having more employees needs a HR module — one that SAP is very powerful and proud of. So, Because SAP is a global leader and posses lots of experiences and resources in dealing with system scaling, it could save more resources to meet the business strategy in the long term too.

2. **Advanced capability gives a competitive edge.**

Although both NetSuite and SAP S/4 HANA are both strongly technically capable, the advanced technology gives a huge competitive edge. The unique selling points for S/4 HANA are its HANA in-memory database and its

advanced patented technology using AI and Manchine learning.

In short and mid term, TGB needs a real-time reporting and an accurate inventory forecasting to meet the section of business objectives (Parizo, 2022). First, S/4 HANA allows faster analytical insights; HANA in-memory database reduces data redundancy for greater efficiency. Managers could leverage this advantage to quickly make decisions without having to switch between systems and applications. Second, using embedded AI and machine learning applications allow a more accurate demand forecasting from TGB's historical data and third-party data like weather or economics. Such capability cannot be done in NetSuite alone, thus using S/4 HANA gives short-and-mid term benefits.

S/4 HANA could enhance TGB's process and gain long term benefits. TGB's business process is mature but needs a re-engineering. So, S/4 HANA could automate some tedious tasks (e.g., allocating workers with higher productivity), and some robotic process automation could be streamline business processes.

3. Better negotiation and standout in competition. Finally, TGB might have a higher position in getting the deal. SAP would want to expand its clientele by inviting TGB to use their system, which means that TGB could have a better price negotiation. Using S/4 HANA could be advantageous too, since Trek — TGB competitor — is using systems like NetSuite and/or Dynamic 365 (Pang, 2022). Therefore, using S/4 HANA might lead to a better deal and standout in competition for TGB.

Suggestion from Jason

In conclusion, we suggested using SAP S/4 HANA based on the three reasons above.

Option 3: Microsoft Dynamics 365 Business Central

Microsoft Dynamics 365 Business Central is a comprehensive business management solution designed for small to medium-sized organisations. The ERP system provides a wide range of functionalities such as financial forecasting, reporting, supply chain management and project planning and tracking.

Alignment with Business Objectives

The system is well-equipped with features that will satisfy TGB's business objectives. The software provides Customer Relationship Management (CRM), Reporting/Analytics and Supply Chain Management along with various useful features. With proper usage, Business Central will provide more than enough support for good customer management and business intelligence. According to customer reviews on g2.com and capterra.com, Supply Chain Management and Inventory Management are parts of the software's core strengths. Therefore, the software will certainly support the organisation in achieving its business objectives in the short and long run.

Technical Capabilities

Business Central is an ideal choice for small and medium-sized organisations since it has flexible scalability within a controlled cost (Technologyrecord, 2018). The software set businesses up for success, helps them build strong customer relationships and has the agility and speed to adapt to changing circumstances as businesses mature. The ERP system allows the business to control its cash flow and have the ability to scale up quickly and safely pull back when certain risks do not pay off. This is one of the crucial benefits for businesses that are eager to grow.

Business Central is evaluated to be easy to set up by many reviewers. If businesses are already using Microsoft products, the software is a natural fit for the existing system. It has seamless integration with Microsoft 365 so employees can do various things like creating and sending invoices and purchase orders directly from Outlook without having to open Business Central (Cargas, 2021). However, if a business does not use Microsoft products (for e.g., TGB), the integration process can take from six months (basic implementations) to two years (with highly detailed customisation). Despite the long setup, the organisation can easily implement other Microsoft products easily in the future if they are

required.

According to multiple reviews, the user evaluates Business Central to be fairly easy to learn and use. Similar to any software, the system also has a learning curve and it takes time for users to use them proficiently. However, with always available learning material such as videos, documentation and webinars (Capterra, 2022a), it will not be a problem for inexperienced users to learn the software. Moreover, the system also enables simplified personalisation. Users can customise relevant applications to adapt to the unique business requirements, which can make the system easier and more familiar to use.

Pricing

The pricing model is a fixed subscription fee per user, per month. For the essential package, it is $70 USD per user, per month and it is $100 USD per month for a Premium user. This pricing model provides flexible scalability as users could be added or removed to increase or decrease the subscription fee. And since the pricing is fixed monthly, the investment required is predictable and easy to manage.

Drawbacks

There are no significant drawbacks except that since it is a Microsoft product, it will best run with the Microsoft ecosystem. Setting up a complete Microsoft ecosystem might require an appropriate amount of initial and ongoing investment which might not be ideal for small businesses.

Option 4: Sage Intacct

Sage Intacct is a cloud-based financial management and accounting software. Focusing on midsize firms, the system provides financial reporting and operational insights as well as the ability to automate critical financial processes. The ERP software provides a wide range of accounting functionalities such as real-time reporting, time and expense management, revenue accounting, etc.

Overview

Similar to many ERP systems, Sage Intacct has all of the features that TGB is looking for in the desired software. The system provides a wide range of useful features such as CRM, Real-time business intelligence, Inventory Management and Supply Chain Management.

According to multiple review websites, Sage Intacct is also another candidate for TGB's choice of an ERP system. Based on TGB's weight score model, Sage Intacct is evaluated to be slightly better than Business Central (G2, 2022a). Most of the criteria are rated above 3.5 (out of 5) by the customers and the scores are up to 0.5 points above Business Central's reviews. These criteria include technical aspects such as scalability, ease of use and integration and organisational aspects such as user support when a problem arises. Sage Intacct is reviewed to be a better system by a small gap. However, there are always two sides to every story, depending on TGB's needs, the difference in review ratings could be negligible.

Sage Intacct versus Microsoft Dynamics 365 BC

One of the most important differences is that compared to Business Central, Sage Intacct is more focused on accounting. Sage Intacct is a "best-in-class solution that specializes in accounting and offers extensive financial management capabilities (Cargas, 2022). Unlike Business Central, Sage Intacct is GAAP-compliant and endorsed by the AICPA. Due to this, the software provides a simpler range of operational functionalities, while Business Central provides a broad range of services that can handle countless tasks and operations. Taking into account this nature, Sage Intacct is more suited for professional services organisations, while Business Central will be most useful for manufacturing or distribution companies (similar to TGB).

Sage Intacct is solely a cloud-based solution. The system cannot be deployed on-premise or hosted in a cloud environment managed by another organisation. The business will solely depend on the provider for everything from handling all upgrades to security. This may not be a favourable or comfortable option for many organisations. Business

Central offers more flexible deployment and allows business to host their own on-premise servers if it is necessary. Which grants businesses more sense of control and security.

Sage Intacct's pricing is less flexible than Business Central. Even though it is not stated on the official page, business technology firm BT Partners reports that Sage Intacct's pricing model runs from $15,000 USD/year for a single-user system to $60,000 USD or more, depending on the complexity of the organisation (Ruiz, 2022). This is way more expensive than Business Central which only costs around $70 USD per user per month ($840 USD per year). Depending on TGB's budget, Sage Intacct might not be the best solution.

Suggestion from David

Considering that TGB is looking for a more ERP-oriented solution with a reasonable point, Business Central is a more suitable solution than Sage Intacct. The software will benefit TGB's characteristics of manufacturing and distribution significantly.

Why prefer SaaS to on-premise?

Regardless which one of four systems TGB choose, an important starting point of our system selection is that all these systems must be able to run on cloud, on-premise, or hybrid. So, four of these systems are chosen. Golla (Golla, 2020) pointed out that SaaS solution for S/4 HANA is optimal for midsize enterprises. First, the deployment is faster and the performance is still high that covers TGB's core business strategies. Second, it provides greater agility, flexibility and faster upgrades cycle for TGB. Since TGB is in that category and those criteria are more suitable, so SaaS is preferred.

On the other hand, on-premise or hybrid require TGB to invest in internal IT support, which currently is not in need. It needs IT support to smooth and stablise operation, with a huge expenses on IT staff as well as the most costly infrastructures. If the investment goes to IT support, that might dilute one in other areas like offshoring manufacturing line, which is not aligning to the objectives. Therefore, given the current scenario, on-premise or hybrid is not preferred.

Exhibit C: Budget Estimate and Financial Analysis

This section justifies the detailed calculation of the Return on Investment (ROI) along with our assumptions. We first listed out the cost breakdown for both on-going and on-off items **??**. Subsequently, shown in Table 5, we took the numbers to project the total cost for the following 5 years. Finally, we performed an budget estimate and financial analysis using the indicators of Net present value (NPV) and ROI; this analysis can be used as a sensitivity analysis since we considered the marginal cases (i.e., best and worse case scenarios). Details can be found in the following tables:

Cost breakdown and five-year estimation for TGB's ERP project

Cost Item	Type	Cost
Implementation cost	One-off	$200,000.00
Infrastructure as a Service	On-going	$54,000.00
Consulting fee	On-going	$30,000.00
Software (Annual subscription)	On-going	$13,200.00
Per user license (Annual)	On-going	$1,800.00
Number of user	On-going	$2,000.00
Software list price	On-going	$3,613,200.00
Employee training	On-going	$505,848.00
Total cost (On-going items)		$4,173,048.00

Table 4: Cost breakdown for TGB's ERP project.

Table 3 shows how much does the project cost with the on-going and one-off items. For implementation cost, Peatfield (Peatfield, 2022) pointed out that ERP implementation can cost anything between $150,000 and $750,000 for a mid-sized business. Therefore, with knowing that there are legacy systems in TGB, we assumed that our cost of ERP implementation is assumed to cost $50000 more which is $200000. For on-going items, four assumptions are made below:

- **Infrastructure as a Service.** Subscriptions the services of HANA in-memory database — which is the data storage technology used for SAP S/4 HANA — is needed. Morgan (Morgan, 2014) mentioned that it cost $4597 for hosting 128GB of data; therefore, we assumed the cost is $4500 per month with discounted included.
- **Consulting fee.** The doom of ERP project could partly attributes the lack of consultation after

implementation so we assumed TGB will hire consultants to evaluate the progress of the project, which costs $30000 with hourly rate per year.

- **Annual subscription.** SAP has been aloof about publishing pricing for its software so we cannot get the exact number. However, what we is well-known is that it costs more expensive than NetSuite — in which its pricing scheme is transparent. If NetSuite costs $999 for its license fee and $99 for user fee per month (Fallon, 2022), we assumed that SAP costs costs $1100 for its license fee and $150 for user fee per month; together, we get the total software listing price $3,613,200 per year, if TGB has 2000 users.
- **Employee training.** To ensure the success of the project, TGB puts its emphasis on training; therefore, a budget is calculated as 14% of the total listing price, lying on the optimal range recommended by Gartner.

As such, the total cost of the project is calculated as $4,173,048.

Cost projection of the TGB's ERP project

	Year 1	Year 2	Year 3	Year 4	Year 5
Software Inc. Discount	$3,129,786	$3,338,438	$3,338,438	$3,338,438	$3,338,438
Implementation	$200,000	$0	$0	$0	$0
Ongoing consulting	$0	$30,000	$30,000	$30,000	$30,000
Total cost	$3,329,786	$3,368,438	$3,368,438	$3,368,438	$3,368,438

Table 6: Cost projection of the TGB's ERP project.

With the above assumptions, Table 5 estimated the cost of the project. We mentioned that TGB could negotiate with the SAP vendor for a better price because of its competitor — Trek is using other vendors (i.e., NetSuite). Therefore, we assumed that the first year discount of the listing price is 25% and subsequent years with a rate of 20%.

Cost-Benefit projection for the project

In the following analysis, we evaluate the cost and benefit for the project. To follow the industry standard, we used NPV and ROI as metrics. We performed the sensitivity analysis of the project by including the marginal cases (i.e., best and worst case scenario) and a normal one for which we made the following assumptions:

- **Profit.** Saxon (Saxon, 2021) defined the benefit gained per year for medium sized business is $19.9 millions and Gartner (Gartner, 2022b) further defined the range to be between 50 million and 1 billion. To fall within the range, the profit is reasonable to assumed to be $1000000.
- **Discount rate** is used to adjusts for the risk of an investment opportunity by discounting future cash flows back to their present value. The bigger the risk, the higher the discount rate (NetSuite, 2022b). We assumed the normal discount rate (DR) is 10% as an industry standard.

There are three tables: It is assumed that the DR of best case is 9% Table 7, and the DR of worst case is 11% Table 10. For the worst case, we take account of the factor of widespread material shortages and production problems. According to Frank Spear (Spear, 2022), the global supply chain crisis of the bicycle industry currently attributes to be:

1. COVID restrictions which are ongoing in some parts of the world like China (Reuters, 2022);
2. the war in Ukraine hike fuel costs up;
3. and high inflation drives up the cost (e.g., labour) (Karp, 2022)

Such on-going factors make us determine that there is the decreasing demand of bikes and supply chain disruption — which makes us determine the discounted rate to be conservatively 11%.

Discount factor	0.92	0.84	0.77	0.71	0.65	
	Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total**
Benefits	$0	$10,000,000	$10,700,000	$11,449,000	$12,250,430	$44,399,430
Discounted benefits	$0	$8,416,800	$8,262,363	$8,110,760	$7,961,939	$32,751,862
Costs	$3,329,786	$3,368,438	$3,368,438	$3,368,438	$3,368,438	$16,803,540
Discounted costs	$3,054,850	$2,835,147	$2,601,052	$2,386,287	$2,189,254	$13,066,590
Cash flow	($3,329,786)	$6,631,562	$7,331,562	$8,080,562	$8,881,992	$27,595,890
Discounted cash flow	($3,054,850)	$5,581,653	$5,661,311	$5,724,474	$5,772,685	$19,685,273
Cumulative disc cash flow	($3,054,850)	$2,526,803	$8,188,114	$13,912,587	$19,685,273	
NPV	**$19,685,273**			**ROI**	**1.507%**	

Table 8: NPV analysis of the best case scenario.

Discount factor	0.90	0.81	0.73	0.66	0.59	
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Benefits	$0	$10,000,000	$10,700,000	$11,449,000	$12,250,430	$44,399,430
Discounted benefits	$0	$8,264,463	$8,039,068	$7,819,821	$7,606,553	$31,729,905
Costs	$3,329,786	$3,368,438	$3,368,438	$3,368,438	$3,368,438	$16,803,540
Discounted costs	$3,027,078	$2,783,833	$2,530,758	$2,300,689	$2,091,535	$12,733,893
Cash flow	($3,329,786)	$6,631,562	$7,331,562	$8,080,562	$8,881,992	$27,595,890
Discounted cash flow	($3,027,078)	$5,480,629	$5,508,311	$5,519,132	$5,515,018	$18,996,012
Cumulative disc cash flow	($3,027,078)	$2,453,551	$7,961,862	$13,480,994	$18,996,012	
NPV		$18,996,012		ROI	1.492%	

Table 9: NPV analysis of the normal case scenario.

Discount factor	0.90	0.81	0.73	0.66	0.59	
	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Benefits	$0	$10,000,000	$10,700,000	$11,449,000	$12,250,430	$44,399,430
Discounted benefits	$0	$8,116,224	$7,823,748	$7,541,811	$7,270,034	$30,751,817
Costs	$3,329,786	$3,368,438	$3,368,438	$3,368,438	$3,368,438	$16,803,540
Discounted costs	$2,999,807	$2,733,900	$2,462,973	$2,218,895	$1,999,004	$12,414,579
Cash flow	($3,329,786)	$6,631,562	$7,331,562	$8,080,562	$8,881,992	$27,595,890
Discounted cash flow	($2,999,807)	$5,382,324	$5,360,775	$5,322,916	$5,271,030	$18,337,238
Cumulative disc cash flow	($2,999,807)	$2,382,517	$7,743,292	$13,066,208	$18,337,238	
NPV		$18,337,238		ROI	1.478%	

Table 11: NPV analysis of the worst case scenario.

Exhibit D: Risks Analysis – likelihood and impact and response strategy

Managing an ERP project is more complex than any other efforts because it brings the organisational transformation which involves a huge number of variables. In this analysis, we summarised 8 risk factors that might fail the project in section ; the aspects combined the knowledge area of project management (e.g., Scope Management, Risk Management, Communication Management, etc) inspired by Chen (Chen et al., 2009) alongside with the problems brought during ERP implementation lifecycle.

For the category of the risks, we based the classification created by Aloini (Aloini et al., 2007) in he defined the four levels of the risks and failure as follows:

(A) Process failure, when the project is not completed within the time and budget.

(B) Expectation failure, when the IT systems do not match user expectations.

(C) Interaction failure, when users attitudes towards IT are negative.

(D) Correspondence failure, when there is no match between IT systems and the planned objectives.

Therefore, eight relevant factors and the risk scores are summarised in Table 12.

Risk analysis of TGB's ERP project

1. Poor scope management: Unclear changing requirements

Description (D2) Changing requirements is unavoidable, but it can easily lead to scope creep. Wanting to offshore some of the business process, TGB will be a multinational company with different regional requirements. Therefore, some degree of customisation for the ERP system will be necessary to meet such specific business requirements (Chen et al., 2009).

Trigger (T2) Although scope creeps could be implicit, some signs are explicit. For example, the users find that the system could not support the business entirely or fit the business objectives.

Cause (C2) This could lead to a destructive situation (Chen et al., 2009). Aloini (Aloini et al., 2007) attributed this to ineffective strategic thinking and planning. For example, TGB's executives did not establish clear vision, the strategic business issues, business goals, and requirement identification, in alignment with ERP system.

Mitigation (M2) To prevent scope problems, four suggestions are listed by Harrison (Harrison, 2020):

- Break down the project requirements, and have them documented and signed by the users and senior management;
- if TGB has more than one business unit or line, the team must define which divisions to include in each phase of the rollout;
- ensure the existence of a project charter or mission statement;
- and clearly define change control procedures and hold everyone to them.

2. Poor Human Resource management

Description (D5) One major issues of every project is staffing issue. Steve Jobs once said "the dynamic range between what an average person could accomplish and what the best person could accomplish was 50 or 100 to 1." (Votaw, 2022) As

Rank	Risk	Type	Description	Trigger	Root Cause	Mitigation	Risk Owner	Probability	Impact	Score
1	Poor communication management	Interaction failure	D8	T8	C8	M8	All level managers	5	4	20
2	Poor change management	Interaction failure	D7	T7	C7	M7	All level managers	4.5	4	18
3	Poor project management and risk control	Process failure	D3	T3	C3	M3	Project manger	3.5	5	17.5
4	Poor integration management	Process failure	D1	T1	C1	M1	ERP consultants and Mid-level managers	4	4	16
5	Poor scope management	Correspondence failure	D2	T2	C2	M2	ERP consultants or Top managers	3	4	12
6	Poor resource allocation	Expectation failure	D4	T4	C4	M4	Top and Mid-level managers	3	4	12
7	Poor top management	Interaction failure	D6	T6	C6	M6	Top managers	2	4	8
8	Poor HR management	Correspondence failure	D5	T5	C5	M5	HR managers	2	3	6

Table 12: Risk register for TGB's ERP project.

such, good technology staff, particularly those with deep ERP experience, could bring a huge benefit.

Trigger (T5) Political implications, poor business performance, low flexibility of skill match, and failure to mix internal and external expertise effectively.

Cause (C5) A shortage of relevant staffs (e.g., IT experts and ERP professionals); the unattractive package of recruitment; and inappropriate staffing by inexperienced HR staffs (Huang et al., 2004).

Mitigation (M5) Train up the exisitng employees to fill the shortage gap or/and offer a more attractive package in recruiting an appropriate talents (Harrison, 2020).

3. Poor resource allocation: Insufficient instruction and training of end-user

Description (D4) As mentioned in Exhibit B, the common mistake that organisation makes is that they are willing spend millions of dollars, groups of experts, and hundreds of hours to implementation the project, but skimp on employee training.

Trigger (T4) The poor resource allocation could lead to two possibility: 1) Reluctant to use the new system which is the problem of poor user involvement; 2) making severe and potentially fatal mistakes that can damage the reputation of TGB (e.g., mistakes on data entry)

Cause (C4) Possible cause is that they get insufficient resources like user supports and/or documentations (Aloini et al., 2007).

Mitigation (M4) Only putting a reasonable proportion of the budgets (i.e., >= 14% according to Gartner research), can TGB hire more quality on-the-job trainings and mitigate this risk. TGB might consider expanding the investment funding.

4. Poor top management: Conflicts between user departments

Description (D6) The implementation of EPR brings the aforementioned changes to the entire organsation. This might destruct some of the

workflow and business process across the functional areas to TGB.

Trigger (T6) As such, conflicts between user departments will be indispensable.

Cause (C6) Umble (Umble et al., 2003) attributed this risk as the insufficient commitment from the top management. Because the top management does not anticipate and plan the profound changes brought by ERP — a sign of not actively participating in the implementation — this brings chaos to the employees.

Mitigation (M6) Huang (Huang et al., 2004) suggested that the management teams (i.e., 0.75% of the employees in TGB) should clearly propagate the importance of ERP project, a transparent definition of objectives, development of a work plan the employees need to take, and establishment of resource requirement plan. Also, he suggested that the top management should facilitate and mitigate the conflicts; that is, without the intervention, no one would make a compromise of rearrangement (Huang et al., 2004).

5. Poor change management: Reluctance to change

Description (D7) "Change management is an approach to transition individuals, teams, and organisations to a desired future state." (Kotter, 2011) As TGB is re-engineering its business processes, IT systems, and business strategies, it brings organisational change which requires a certain period of this accommodation.

Trigger (T7) could be explained in three level: For project-level, employee resistance could lead to Project delays budget overruns, missed milestones, design rework. Secondly, for system level, it could lead to low ERP benefits realisation by mismatching business goals. Thirdly, for the organisation, the triggers are massive employee attrition, dips in productivity, or even more serious, employees resign. All of which could affect both financially to TGB, and talent loss of those 2000 employees, if not meticulously planned.

Cause (C7) Some causes may include:

- Implementing too much change at once;
- failure to define a clear rationale for the change;
- skill gap;
- fear of feedback;
- and declare sucess to early

These lead to resistance to change. It results in employee confusion and frustration, low employee morale.

Mitigation (M7) The principle of Kotter's 8 steps (Kotter, 2011) could lead change management to be more smooth. TGB executives could take that as a reference.

6. Poor communication management: Ineffective communications among stakeholders

Description (D8) While factor 6 is more about the expectation failure, this one is about interaction failure (Aloini et al., 2007). According to industry survey, 14% attribute this factor to be the reason why a project would fail (Trepper, 1999). As TGB is taking some of the business process offshore, meaning that there will be a cultural issues and language barrier among intenal teams. Ineffective juggling of virtual teams and imbalanced remote meetings might lead to a communication breakdown.

Trigger (T8) An example of a communication breakdown could be that there are severe organisational politics and power fights.

Cause (C8) Three main causes are listed:

- Lack of agreement on project goal (Huang et al., 2004);
- presence of conflicts and resentment caused by hostility, jealousy, frustration, and low morale (Chen et al., 2009);
- and low working morale.

Mitigation (M8) Chen (Chen et al., 2009) suggested that an open forum for internal employees is important. Not only does it bridge the communication and objective gaps among stakeholders (e.g., TGB's manager, contract workers, and end-users), but also ensure issues and priorities could be expressly discussed, thereby preventing paralyse in communication.

7. Poor integration management: Complex software design

Description (D1) Integration management is a place where it directs all stockholders of the project, Strategic Business Unit (SBU), and coporate levels towards the same direction with ERP system.

Trigger (T1) An obvious trigger is the data duplication during the integration with legacy system and data migration. Such a data management could bring severe impact as data is an important asset.

Cause (C1) The capability of the current enterprise infrastructure is a main concern to TGB's seniors and IT experts. This is because the legacy systems are 40-year-old in which the stability of the technology might be affected. Infrastructure here in the sense could mean the servers, data warehouse, and so on.

Mitigation (M1) As the transition phase is a critical period, the need for a carefully managed view of legacy systems should be stressed, particularly in the stage of post-implementation review (Aloini et al., 2007). For example, the interfaces must be able to handle complex data sources and legacy data types with client/server systems exchanging data with the ERP system (Harrison, 2020).

8. Poor project management and risk control

Description (D3) As TGB has 15 operational managers and 20 middle managers, we assumed some of whom work as a project manager. Their roles are critical to the ERP transformation. They need to consider the internal risk (e.g., project size, duration, organisational structure, complexity, and outsourcing), and external ones (e.g., economic situation, new business models, and competitors).

Trigger (T3) Some obvious triggers are:

- Budget exceeds;
- Time exceeds;
- and bad financial performance for TGB

Cause (C3) The cause could be that the project managers (PM) are not experienced enough and ones are not using effective project management methodology. The composition of team members (i.e., among TGB's IT teams and PMs) could be another one where they might also have disagreement on project goals.

Mitigation (M3) PM should adopt a formal method of assessing risks, such as developing a list of performance metrics in TGB, considering how to measure them, and obtaining regular performance measurements (Chen et al., 2009). A critical path analysis should be done to ensure correct scheduling. When identified slack performance, they can manage those risks by tailoring specific action strategies, risk control process to cater that contexts.

Criteria	Weight	SAP S/4 HANA	Oracle NetSuite	Microsoft Dynamics 365 Business Central	Sage Intacct
Techincial aspect (25%)					
Technology and future scalability (Scalability)	7%	4	4.5	3.9	4
Customisable and allows configuration as per business-specific requirements	3%	3.75	4.5	4.05	4.1
Integration and deployment with the existing system (Integration)	7%	4.25	4.05	4.2	4.15
Performance and reliability	5%	4.4	4	4.05	4.2
Ease of use (Simplicity)	3%	4.25	3.7	3.5	4.25
Organisational / people aspect (20%)					
User support	20%	4	4.1	4	4
Business objectives (45%)					
Better customer management	10%	4.55	4.34	4.33	4
Real-time interaction with business intelligence	10%	4.9	4.12	4.39	4.34
Supply Chain Management: Inventory management	10%	4.6	4.05	4.2	4
Supply Chain Management: Manufacturing management (E.g., cost and profitability)	10%	4.32	4.225	4	3.9
Temporal aspect (5%)					
Able to implement the system within the planned timeframe	5%	4.68	4.63	4.27	4.21
Financing requirements (10%)					
Pricing flexibility	10%	3.4	4	4.3	3.5
Total	100%	51.1	50.2	49.2	48.7

Table 13: Weight factor scoring model.

How do we rate these criteria?

As we did more online research, we found that there is a compendium of sources that contain the review ratings of the systems we selected, most of which are for the sake's of marketing their services or products.

To mitigate this rating bias, we first take the rating from Gartner (Gartner, 2022a) as a standard, then we get scores from Capterra (Capterra, 2022b), TrustRadius (TrustRadius, 2022), G2 (G2, 2022b), and at the end we average scores from these four platforms to get the final scores.

All these sources are peer-to-peer general software review platforms instead of ERP-wise website. And we chose Gartner — an IT research and consultancy organisation — as a standard because its metrics are well-known in the IT industry (Techtarget, 2022), and it is regarded as one of the most trusted and prestigious research and advisory firms in the world (Firsthand, 2022). Therefore, we decided to use this objective method to avoid the ratings solely for marketing purposes.

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