



INFORMATION SYSTEMS DEVELOPMENT PLAN FOR WATER ZIP PURIFIED DRINKING WATER

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ABSTRACT

Firms that embrace information systems and technology are most likely in advantage compare to those who are still in traditional systems. Specifically, Enterprise Information Systems (EIS) provides managerial support and operational support. Information systems use their efficiency in gathering, storing, processing, and distributing information to improve the organization's business processes. With information systems and technology, there are so many varieties of strategies that will support the organization to find opportunities to gain more profit.

Through information systems, most of the organizations are still standing firm up to now. I.S. is essential for an organization's survival. Competitions in the market keep swelling up, and information systems enable businesses to keep up and survived with those competitions or even give them a competitive edge to its oppositions.

KEY WORDS: *Businesses processes and routines, Enterprise Information Systems, I.T. Infrastructure, Competitive Advantage, Operational Excellence.*

1. INTRODUCTION

Information is vital to the success of an organization. Organizations must understand their internal processes and the nature of the environment to which they must adapt and respond to grow and survive. With information, decision making will be improved, and it will enhance the organization's efficiency and provide an advantage against its competitors [1]. Different business processes need precise and accurate information to function efficiently. With the help of information systems and technology, retrieving important information will be faster and more accurate.

In business, like a water refilling station, accurate information is a must because water is necessary, and a diverse client's need is to be expected. Without precise information, more operational costs, time, and work will be wasted. Business processes that need information are in high need of information technology and systems like in the accounting department where they always need, produce, and distribute information to other departments of the organization [2]. Without information systems and technology, sharing or retrieving information will be hard. The collaboration will not work well, and decision making will be delayed, or a risky decision will be made.



Almost all businesses today are computer-based and very dependent on telecommunication networks, and the internet, even the smallest kind of businesses are relying on technology. If we observe how people do business nowadays, we can say that business without technology is impossible. From communicating customers or vendors, it is essential to have a phone and a network connection. Even in the most straightforward transactions, technology is a must.

Many small organizations are afraid and hesitant to invest in information systems and technology because of various reasons, such as the cost of investment or the fear of what change it would bring to the organization. But even with these reasons, they can't stop people from using technology, nor prevent their competitors from upgrading their business processes by information systems and technology. This paper aims to propose an I.S. development plan to let organizations understand the role of information systems and technology in global business today and give them an idea of how these two will give them a competitive edge against its competitors.

1.1 Background of the Company

Purified water is instinctively filtered or processed to be cleaned for drinking. It reduces the unintentional exposure to toxins for it undergoes several processes that would make the water safe to drink. It also has a better taste that is good for everyday consumption. Purified Water Businesses rule the percentage of all water consumers shown by the growth of this kind of business in terms of population and continued existence in any part of the Philippines, both in cities and in rural areas[3].

One of these businesses is the Water Zip Purified Drinking Water that is owned by Nely Napuli. It was established last October 25, 2012, and it is situated in Purok Tambis, Sto. Nino, Wharf Road, Panabo, Davao del Norte. Mrs. Napuli picked this water refilling business, for she was confident that this kind of business is optimal, especially in Panabo City, where most of the water source is not ingestible. She also has the confidence that this type of business would not be quickly down since water is a necessity for humans.

They got their water source from Panabo Water District. While their stickers and the plastic seals used for the water containers are from Watersource System Technology Corporation located in CM Recto, Davao City. Their supplier for the water containers is the Bottle King Enterprises located in Tibungco, Davao City. The business also has a complete permit that makes their business legal and functional.

Water Zip Purified Water runs smoothly for more than seven years, even without any technology used aside from their CCTV (closed-circuit television), calculator, and water filtration machine. All their business operations and transactions are manual, which means they keep records of their business transactions by hand, which may result in inaccuracy or counterfeiting of records. Manually keeping the records has no guarantee that everything that was in record is accurate or correct. By just putting everything in a notebook might cause more significant problems in the future because their records might be damaged, altered, or worst it might be lost.

1.2 Business Processes and Current Routines

1.2.1 Business Processes

If one desires to have better chances for success in business, he must complement his knowledge by studying the essential skills needed to operate whatever size business is, either small or medium-sized business[3]. Since Water Zip Purified Drinking Water's business processes are not automated, they carefully record every transaction by hand in a notebook from counting all their full and empty water containers to the delivery, to their daily point of sales, and even to their monthly and yearly inventory.

Currently, they have a total of eight (8) employees. One is the in-charge of administrative duties such as keeping records, logging and handling cash sales, and she is also the one receiving the calls or SMS from the customer's order or delivery request. Three (3) are in the processing area wherein the one is the cleaning and refilling the empty returned containers, while the other is sealing it. The last one is arranging both the empty and ready for sale water containers. He is also helping customers who personally come to the station to lift the containers they order into their car. The other four (4) are in the delivery operation.

Subsequently, Water Zip Purified Water has two (2) delivery trucks. Each of them has a driver and a helper. They are delivering in different areas every single day contingent on the schedule set. Before leaving, the administrative assistant will count first the refilled water containers that the delivery trucks bring. Upon delivery, it is the driver who collects all the payments. He has his records of how many bottles that a customer acquired and returned. After delivery, the administrative assistant will check the driver's record and payment collection. The administrative assistant is responsible for answering customer's calls or SMS wherein they prioritize customers who call rather than the one who just send an SMS. Whenever there is a



delivery request, they will immediately deliver as long as there is an available truck to transport.

The administrative assistant manually checks their daily point of sale. She also keeps a record of the hours rendered by her co-workers and their absences. Their payroll is manually computed every 15th and 30th of the month. The workers assigned in the water processing area do their overtime whenever there are lots of empty water containers returned. The administrative assistant

also accommodates customers who came by the station for their orders. They also allow weekly payment to their trusted customers. The same with their other operations, their inventory is done manually on a monthly and yearly basis for their investment return.

1.2.2 Current Routines

Below is the Event Table of the current business processes of Water Zip Purified Drinking Water.

Table 1 Water Zip Purified Drinking Water's Daily Event Table

Time	Task/Routine
8:00 AM – 9:00 AM	* Staff in the refilling room, prepares the machines, and cleaning everything in the room. * The delivery team checks the truck and also cleaning it. * The administrative secretary is preparing the list of orders and delivery.
9-00 AM – 12:00 N.N.	* Normal operation starts (Delivery, cleaning and refilling empty bottles, and receiving orders via call/SMS/directly on the counter).
Noon N.N. – 1:00 PM	* Lunch break
1:00 PM – 4:00 PM	* Back to regular operation
4:00 PM – 5:00 PM	* Reporting of total refilled bottles, reporting the delivery team, computing daily sales

As we noticed, their routines are simple, but they need precise information to function more efficiently. Their routine has no specificity like how many target bottles should be made for the day, where the delivery is, and many more. Though their work looks effortless, each of the employees needs information to do their jobs well.

1.3 Problems Found

As the business is running manually for more than seven (7) years, it is inevitable to face various business operations problems. These problems must be addressed for the business to be more efficient and effective in its operation to earn more profit and diminish unnecessary expenses.

Their first major problem is their record keeping. They are all keeping their transaction records by hand in a notebook or paper with no backups. Writing it in a notebook or paper has no guarantee that everything that is recorded is accurate. It can be easily altered, damaged, or lost. Transaction records are one of the cores for businesses, so it must be secure, accurate, and credible.

Since the transactions are recorded manually, computing their daily point of sale is a hassle work for the administrative assistant, considering that she has a lot of responsibility aside from managing the cash sales. At the end of the day, it consumes a lot of time to compute their daily sales that lead to additional payment for the employee's overtime at work.

Inventory is also affected by their manual record keeping. They count and trace everything manually in a

notebook. It is time-consuming to regain the data needed for the inventory. Similarly, in computing their daily point of sale, it also led to extra hours of work to personnel involved in this process.

The other problem we found is in their delivery. Though the delivery operation follows a particular schedule, there will inevitably be customers who abruptly request for water supply. They will undoubtedly transport the orders without minding the gas consumed for an abrupt delivery. They lack records for their customer's consumption, which is why there is a shortage of supply to their customers, leading to repeated transport in the same area.

1.4 Goals and Objectives

The main objective of this Enterprise Information System Development Plan is to help Water Zip Purified Water Refilling Station solve the shortcomings of its business processes. This development plan will help the efficiency and accuracy of their business processes and daily event routines.

1.4.1 Specific Objectives

Specifically, this project will provide an essential plan using an information system that will accelerate their business processes. The following are the specific objectives aim by this development plan:

1. Provide a system that will collect all data, store them, process it, and distribute it to end-users who need it.
2. Organize all their data for easy retrieval when needed.

3. Collect their customer's water consumption and make that information to make their water delivery schedule.
4. Compute the employee's salary based on work rendered or delivery done and insurance

5. Make a monthly, quarterly, or annual report of their sales analysis.

1.5 Organizational Structure

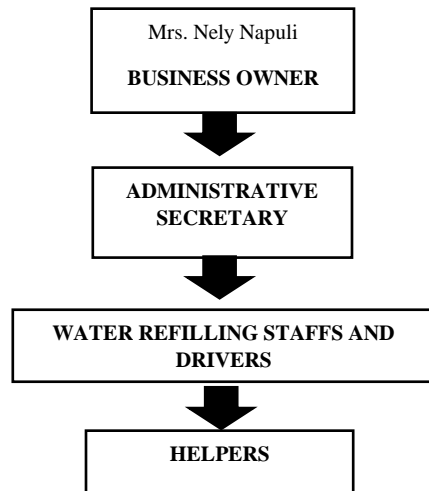


Figure 1 Organizational Structure of Water Zip Purified Drinking Water

1.6 Stakeholders

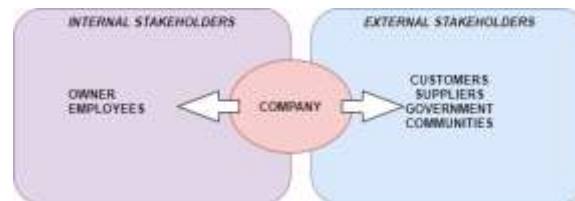


Figure 2 Water Zip Purified Drinking Water Stakeholders

2. PROPOSED INFORMATION SYSTEMS

After some research and studies, the authors proposed an Enterprise Information System to help the firm solve its current complications on its business processes and current routines.

2.1 Review of Related Studies

With the rapid growth of technology development, most organizations are also trying to exploit its benefits. Today, businesses with no information systems or technology merely survive. Whether organizations like it or not, the use of technology is inevitable. Many organizations adopt a new technological environment before they are overwhelmed by other firms that embrace the new trend of using technology. As we are in the midst of the

era of globalization, Small-Medium Enterprises (SMEs) are also amid survival. Their understanding and acknowledgment of the importance of information that I.S. and I.T. bring determines their survivability[4]. It is a waste of cost and effort using technology alone without a plan to where and how to use it. An information system is the best option to exploit the benefits of technology.

There are many kinds of information systems that can be used in all various sizes of enterprises. One of them is the Enterprise Resource Planning (ERP) system. Unlike other systems individually set in each department, this system is an integrated enterprise system that supports the entire business process by automating the flow of information and financial

resources across the entire organization on a shared database[4].

To make it clear, below is a representation of what an ERP system does:

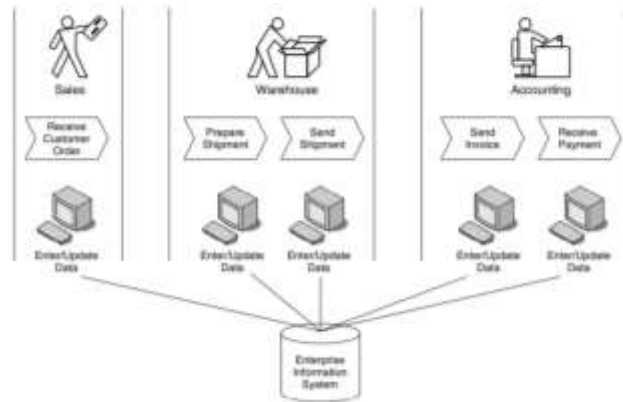


Figure 3 Representation of Enterprise System Function

Source: Simha R. Magal and Jeffrey Word's *Essential Business Processes and Information Systems* (page 17).

Compare to other non-cohesive departmental systems, ERP offers two main aids to the organization: (1) an incorporated sight to an enterprise that covers all functions and sections; and (2) a shared database where all enterprise transactions are stored, recorded, processed, monitored, and reported[4]. This system is designed to elevate an enterprise's ability to produce appropriate and accurate information that will help them attain improved performance and productivity[5].

Some studies say that with ERP, organizations' quickness with their delivery has increased and improved their services [6]. It also improves decision-making, one of the essential factors in obtaining a competitive advantage[7]. With this system, inventory management is enhanced where less time and effort are needed[8]. Like the other systems, ERP's function cannot be exploited without the willingness of the internal stakeholders to adopt the changes it will bring and without acknowledging this system's potential.

2.1.1 Related System

There are a lot of choices in selecting what I.S. an organization should use. It needs a critical study and a clear envision of why an I.S. will be implemented. Today, more and more organizations are using an ERP system. Many studies have proved the effectiveness of ERP. When this system is adequately entrenched to the daily operation, management, and decision-making procedure of an organization, it can deliver a competitive advantage to them[9]. A lot of business functions are improved with the use of ERP, such as improving decision-making by producing accurate and

timely information, efficient delivery of products, and flexibility in meeting diverse client's needs [7][8].

One example of ERP was the one mentioned in one of the case studies of the book *Management Information Systems (Managing the Digital Firm)* by K.C. Laudon and J.P. Laudon[10] that is located at the end of chapter 9. The Border States Industries, which was known before as Border State Electrics (BSE) located in Fargo, North Dakota, was already a user of ERP system called Rigel since 1988. Over the years, they switched to Systems Applications and Products (SAP), which is currently the leading company for ERP systems. Their system provided Border State Industries solutions such as management of sales and distribution, materials management, financials and control, and human resources. At first, the company was having a hard time using the new ERP system from SAP. Eventually, they exploited it after embracing the new technological environment that the system brings and used the best of the system that helps them increased their profits and expand their business to various areas.

Any information systems bring changes to all aspects of an organization. Embracing these changes is the key to use its full potential that will surely deliver a competitive advantage to the organization.

2.2 Enterprise Resource Planning System

ERP system is an integrated enterprise system that automates the flow of information and financial resources of an organization that will help their entire business process become efficient. With this system, they can save their operational costs, secure their data, and will have a better vision of the entire organization

that will help them make right and reasonable decisions.

2.2.1 Functionality

- Already has a centralized module where all information needed for a specific operation was contained in the same part of the system that will allow the users to manage grouped tasks.
- Inventory management will give users more control and visibility over the organization's stocks.
- Purchasing management for the supply chain of the organization.

- Manufacturing solution gives the organization an overview of all product orders, including time tracking, operations tracking, and inventory handling.
- Sales and CRM (Customer Relationship Management) will support the organization's sales group and make customer service better.
- Data security ensures the organization's data privacy.
- It provides financial tools that will help them cater to online payments.

2.2.2 System Architecture

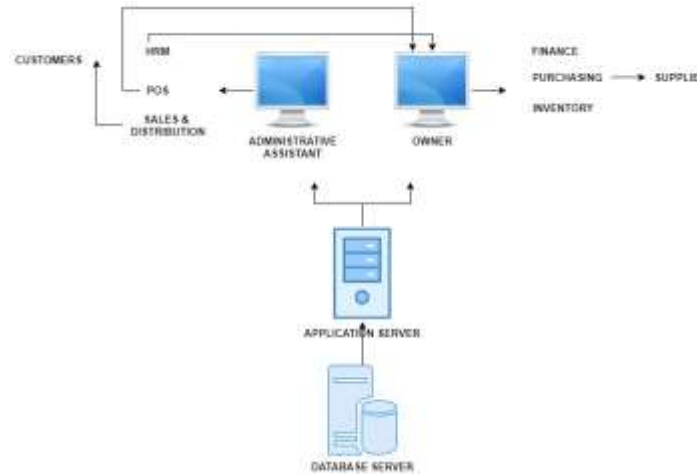


Figure 4 Water Zip Purified Drinking Water System Architecture

2.2.3 Economic Feasibility

Cost Description	Cost (PHP)	Total Cost
ERP Software	20,000	
Training Cost	6,000	
Customization of software	5,000	
Software Maintenance	5,000	
		36,000

Table 2 Economic Feasibility of Water Zip Purified Drinking Water

3. PROPOSED IT INFRASTRUCTURE

3.1 Proposed Computer Hardware

It is crucial to consider an upgrade of existing hardware or add additional investment to it, for it is essential to implement the ERP System.

Desktop Computer

A personal computer to monitor daily transactions of the entire business and a desktop computer for the administrative assistant will help her manage the business' daily operations.



Printer

A printer that will print template invoices that will be used by the delivery team and by the administrative

assistant when a customer order personally at the refilling station, and for other purposes.

Table 3 Proposed Computer Hardware

Computer Hardware	Specs	Cost (PHP)	Qty	Total Cost (PHP)
Dell Optiplex 5260	1920 x 1080 All-in-One Desktop Computer with Intel Core i5-8500 3 GHz Hexa-Core, 8GB RAM, 128GB SSD, 21.5" 802.11AC + BT (GTVV0)	32,999.50	2	65,999
Printer	All in One	3,229 PHP	1	3,229
				<u>65,999</u>

3.2 Proposed Operating Platform

Authors have proposed Microsoft Windows for the Operating System since here in the Philippines most people are already familiar with the O.S. The familiarity of the user interface is just the beginning for staff. This O.S. has proven itself over many generations of quality service, especially on businesses.

Microsoft Windows 10 Operating System

We proposed this O.S. because of its universality that fits any kind of organization. Since the ERP system is a centralized database system, its O.S. cloud-based applications and storage will be perfect for the system. This O.S. also offers robust security through its Windows Defender Security Centre (has security protocols over applications, credentials (logins and passwords), and specific file access.

Table 4 Proposed Operating Platform

O.S. Platform	Unit Cost (PHP)	QTY	Total cost (PHP)
Microsoft Windows 10 Pro	14,999	1	14,999
			<u>14,999</u>

3.3 Proposed Enterprise Software Application

We recommend the ERPAG ERP System since they offer a module with features that fit the needs of Water Zip Purified Drinking Water. Also, this

ERP system company has many positive reviews that help us decide to recommend their software. The table below shows the full overview of the ERPAG ERP system:



Table 5 ERPAG ERP System features

Feature	Description	Specifications
ERPAG General	Set of modules packed into all-in-one MRP cloud-based systems.	<ul style="list-style-type: none"> • Cloud-based • Access via a web browser • No installation • User-friendly interface • Free software maintenance • Free updates • Works on every O.S. (PC, Mac, Linux, etc.) • iOS and Android apps • User-based pricing
Inventory Management	Advanced inventory management, including LOT, Barcode, and Serial number tracking. It also supports complex products like product variations, a Bill of materials-based items, and Kits/Assemblies. Non-inventory items included for tracking costing in complex assemblies.	<ul style="list-style-type: none"> • Storage locations and bins • Multi-Level Bill of Materials • Lot tracking • Lot Label printing • Expiry dates management • Automatic Inventory • Backordering • Multiple-suppliers (built-in logic) • Tier pricing • Low inventory alerts • Shipments • Detailed item descriptions - attachments, plus display images or drawings • Import items • Inventory variations • Serial number tracking • Custom fields (Item, Supplier, Document) • Barcoding and scanning • Mobile app + Phone camera support for scanning (Android, iOS) • Returned goods Management (RMA) • Min quantity



Manufacturing	Complete Manufacturing solution for small businesses. Track LOT and Serials, combine items in BOM and get a real-time overview of your work orders even on a mobile device. Also, know your Shop floor with time track, operations track, and inventory handling.	<ul style="list-style-type: none"> • Bills of materials (BOM) • Material planning • Shop floor reporting • Manufacturing cost tracking • Import Bills of Materials • Expiry date management • The expected date for each Work Order line • Re-work of products • Just-In-Time delivery
Purchasing	The supply chain for small businesses. Ordering based on a predefined set of rules. Minimum qty, back-ordering, automatic fulfillment combined with multiple suppliers, tiered pricing, and multi-currency engine.	<ul style="list-style-type: none"> • Purchase suggestions • Low inventory alerts • Purchase Order auto-fill from fulfillment • Automatic Purchase Order creation • Vendor information and pricelists management • Material forecasting based on BOM • The expected delivery date for materials • Lot tracking • Serial number tracking • Lot Label printing • Stock planning – bookings for production and shipments, future incoming stock • Low inventory alerts • Live inventory adjustments, incl. upload from CSV • Shipment planning and reporting • Attachments, plus display images or drawings • Import Products and Services • Products with variations • Expiry dates management • Custom fields • Barcoding and scanning • Phone camera support for scanning (Android, iOS)



		<ul style="list-style-type: none"> • Returned goods (RMA) • Multiple warehouses • Transfers between warehouses • Import vendors • Import purchase terms • Import Purchase Order
Sales and CRM	Provide full support for your sales team. Track opportunities generate complex estimates paired with multi-level BOM. Implement price tier policy using ERPAG price tier engine and customer B2B portal.	<ul style="list-style-type: none"> • Sales order recording • Sales funnel - order fulfillment from quotation to delivery • Automatic fulfillment generation based on sales, low levels • Estimating costs and delivery time • Customer contact management • Customer sales report • Invoicing • Import sales order • Sales management
Finance	Complete set of financial tools	<ul style="list-style-type: none"> • Invoicing • Actual Costing • Manufacturing overhead cost • Services and operations cost • Cashflow forecast • Sales Report • Cost-profit reports • Order recording • End to end tracking (From sales to manufacturing to ordering, to delivery) • Estimating costs and delivery time • Customer contact management • Customer and sales management • Invoicing • Import customers • Import sales order •

Source: ERPAG Official Website

Among all these features, we proposed the Inventory Management System, Sales and CRM system, and

Finance. Below is the proposed ERP System Cost per month:



Table 6 Enterprise System Cost

ERP Application	Specs	Unit Cost (PHP)	QTY	Total Cost (PHP)
Standard Plan	Five user account All features Video Training Material Integrated in-app chat E-mail support Server computing resources: High Database size: 10GB	3,933.65	3	11,800.95
				<u>11,800.95</u>

3.4 Proposed Data Management

Authors proposed this type of data because of the same reason, familiarity for the users, and easy interface that makes it user-friendly.

Table 7 Proposed Data Management

Data Management Type	Specs	Cost	Qty	Total cost (PHP)
Microsoft 365 Family	Up to 6 users 1TB of cloud storage per user Access (P.C. only) Excel Outlook	4,699	1	4,699



	PowerPoint			
	Publisher (PC only)			
	Word			
	Skype			
	OneNote			
				<u>4,699/year</u>

3.5 Proposed Network and Telecommunications

Since the ERPAG ERP system is cloud-based, an internet connection is a must. Their office is also located at the center of the city, so a stable connection is assured.

Table 8 Proposed Telecommunication Network

Network and Telecommunication	Specs	Unit Cost (PHP)	Qty	Total cost (PHP)
PLDT Enterprise	50mbps (Fiber) Business-Grade Wi-Fi Business Landline	2,500	1	2,500
				<u>2,500</u>

3.6 Proposed Internet Platforms

Improves customer relationships and transactions.
 Improving the agility of business transactions,
 especially in terms of cash payments.



Table 9 Proposed Internet Platforms

Internet Platforms	Specs	Cost/Unit (PHP)	Qty	Total cost (PHP)
Social Media Page	Own advertisement Customer Relationship and Contact	Free	1	Free
Smart Money	Online payment for customer	Free	1	Free
Gcash	Online payment for customer	Free	1	Free
				Free

3.7 Proposed I.T. workforce

Table 10 Proposes I.T. Manpower

I.T. Personnel	Job Description	Salary
I.T. Support Technician	Installs and maintains computer systems and provides end-user technical support. Primary contact for technological issues. Train or support end-users on software and hardware.	400/day

4. CONCLUSION AND RECOMMENDATION

4.1 Conclusion

The overall study shows that Water Zip Purified Drinking Water needs an information system and technology to upgrade its business model. They've been sticking to the traditional system, the manual one, and they are still able to manage their organization somehow. But with this proposed development plan, authors have seen the potential of significant improvement for their organization performance and will robust their profit.

4.2 Recommendation

Hopping from the traditional system to automated one will surely overwhelm the organization. But we

recommend their earnest patience and willingness to adopt the new environment for the betterment of the business. We recommend the ERP system because it is user-friendly and fits an organization like Water Zip Purified Drinking Water, which jumps off from the traditional system to automated one. Several studies have already proven the effectiveness of the ERP systems as long as the organization is willing to adopt and acknowledge its full potential. It will help the organization achieve operational excellence and it can also provide a competitive advantage.



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