

ASSIGNMENT 1 FRONT SHEET

Qualification	BTEC Level 5 HND Diploma in Computing		
Unit number and title	Unit 14: Business Intelligence		
Submission date		Date Received 1st submission	
Re-submission Date		Date Received 2nd submission	
Student Name	Bui Quang Minh	Student ID	GCD210325
Class	GCD1104	Assessor name	Phan Thanh Tra
Student declaration I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.			
		Student's signature	

Grading grid

P1	P2	M1	M2	D1	D2

☐ **Summative Feedback:**☐ **Resubmission Feedback:****Grade:****Assessor Signature:****Date:****Internal Verifier's Comments:****IV Signature:**

Contents

DISCUSSION	5
I. Business Processes (P1)	5
1.1 Definition of Business Process	5
1.2 Why are business processes important?	5
1.3 Types of Business Process.....	5
1.4 Steps of creating an effective Business Process	7
1.5 Examples of Business Process	8
1.6 My Dataset.....	9
II. Unstructured and Semi-Structured Data (M1)	10
2.1 What is Structured Data	10
2.2 What is Semi-Structured Data	11
2.3 What is Unstructured Data	11
2.4 Highlight Differences.....	13
III. Evaluation of Application Software for Business Processing (D1)	13
3.1 What is Application Software?.....	13
3.1.1 Definition	13
3.1.2 Difference between system software and application software.....	14
3.2 Types of Application Software	14
3.2.1 General Application Software	14
3.2.2 Customized Application Software.....	16
3.2.3 Business Application Software.....	17
3.3 Benefits and Drawbacks of Using Application Software.....	18
3.3.1 Advantages.....	18
3.3.2 Disadvantages	19
3.4 Application Software Examples	19
COMPARISON.....	21
I. Support for Business Decision-Making at Different Organizational Levels (P2)	21
1.1 Decision-Making Definition.....	21
1.2 Decision-Making Levels.....	21
1.3 Comparison	23
II. Key Features of Business Intelligence Functionality (M2)	23

2.1 What is BI Tools.....	23
2.2 Features of business intelligence.....	24
2.3 Specific examples.....	26
III. Comparison of Information Systems and Technologies (D2)	27
3.1 Identifying Information Systems that support Organisations	27
3.1.1 Operational Level.....	27
3.1.2 Tactical Level.....	27
3.1.3 Strategic Level	28
3.2 Identifying Technologies that support Organisations	28
3.2.1 Artificial intelligence	28
3.2.2 Online Analytical Processing (OLAP)	28
3.3 Comparing and Contrasting types of information systems	29
3.3.1 Similarities of Information Systems.....	29
3.3.2 Differences of Information Systems	29
Table of Figures.....	30
Table of Tables	31
Reference List	32

DISCUSSION

I. Business Processes (P1)

1.1 Definition of Business Process

A business process refers to a series of activities aimed at facilitating the delivery of products or services to customers, whether directly or indirectly. These processes form the essential framework of any business operation. The efficiency of employees on a daily basis and the overall expansion of the business hinge upon the adept management of these processes.

1.2 Why are business processes important?

Understanding and implementing your business processes can lead to significant improvements in your workload. Here are several reasons why knowing and executing your business processes is crucial:

- **Time-saving:** The adage "Time is money" has stood the test of time for a reason. Clear and well-aligned business processes enable efficient use of time for both employees and customers. Timeliness is particularly important for customer satisfaction, as delivering on promises promptly enhances their experience. Given that acquiring new customers is considerably more expensive than retaining existing ones, prioritizing customer satisfaction saves money. Additionally, streamlined processes, such as onboarding new employees, reduce manual effort for HR and new hires, boosting overall productivity.
- **Decreased opportunity cost:** Opportunity cost refers to the benefits lost when opting for one choice over another. While we can't exist in multiple realities like Schrödinger's cat, saving time in one area allows for its redirection to other tasks. Effective business processes are instrumental in reducing opportunity costs. For instance, if HR is not preoccupied with new employee onboarding, they can dedicate their time to more productive endeavors.
- **Enhanced efficiency:** Clearly defined processes within your business enhance clarity and efficiency. When everyone within the organization understands their roles and tasks in sequence, it minimizes redundancies and maximizes efficiency across the board.

1.3 Types of Business Process

Operational Processes:

These represent the core functions of a business, directly aligned with its foundational values, vision, and mission. Often referred to as primary processes, they merit special attention as they constitute the primary revenue generators for the company. Addressing gaps and implementing necessary enhancements within these processes is crucial. Evaluating and refining these processes directly influences the business's growth trajectory.

For instance, in a McDonald's restaurant, operational processes encompass tasks such as taking orders, food preparation, and serving customers.

Management Processes:

These processes encompass the planning, organization, coordination, and control of all business functions. Goal-oriented in nature, they involve guiding and motivating teams to achieve their objectives. Management processes also play a pivotal role in charting the course for the business's future expansion. Activities such as overseeing day-to-day operations, providing effective task guidance to employees, and launching new products fall under this category.

Typically, CEOs, managers, and top-level management are responsible for overseeing management processes.

Support Processes:

These processes do not directly contribute to product or service delivery to customers but rather create an enabling environment for the smooth functioning of primary processes. Hence, they are termed "supporting processes." These processes often reside within departments such as accounting, human resources, and other areas that facilitate the core functions of the business.

For example, hiring a new employee serves as a supporting function that aids in the business's expansion efforts.



Figure 1. Types of Business Process

1.4 Steps of creating an effective Business Process

There are several steps involved in crafting effective business processes. While there's no universal rule dictating the sequence, we've developed these steps by analyzing various theories and our own business practices.

1. Establish Clear Objectives:

Define the desired outcomes of your business process. This clarity forms the foundation of your process and provides it with a clear direction. It's essential to attach quantitative metrics to your objectives to gauge results effectively.

For instance, in a courier business, an objective could be to reduce each delivery person's travel time by 30 minutes. Defining this objective sets the stage for subsequent actions.

2. Generate and Evaluate Alternatives:

Once the objectives are defined, brainstorm and assess all possible alternatives. Each alternative carries an opportunity cost, so the goal is to identify the most suitable option with the least opportunity cost.

For example, solutions to reduce delivery time could include shift scheduling, providing skateboards, or optimizing routes. Evaluate these alternatives to determine the most feasible and effective one.

3. Engage and Assign Stakeholders:

Involving stakeholders in the process design phase is crucial. Ensure that all involved parties understand the process thoroughly as they play a direct role in its execution. This understanding saves time and minimizes errors in the long run.

4. Test the Process:

Before full implementation, test the process on a smaller scale. Practical experience helps identify any gaps or overlooked details in the process design. Addressing these issues ensures a smoother transition to full implementation.

5. Implement the Process:

Once any identified gaps are addressed, implement the finalized process into your business operations. With stakeholders informed and engaged, the likelihood of discrepancies decreases significantly.

6. Analyze Results:

After implementation, assess whether the process achieves the desired objectives. Compare performance metrics before and after implementation to evaluate effectiveness.

For instance, compare delivery times before and after process implementation. If objectives are met, the process is deemed effective. If not, adjustments are necessary to optimize the process. Through iterative refinement, optimal results can be achieved over time.



Figure 2. Steps of Business Process

1.5 Examples of Business Process

Here's a simplified illustration of Business Processes in two different industries:

1. Industry: Marketing

- Company Type: Advertising Agency
- Process: Ad Creation

Creating advertisements in a marketing agency involves several steps:

1. Understanding client requirements
2. Brainstorming ideas for the ad
3. Developing a campaign
4. Presenting the idea to the client
5. Obtaining approval
6. Making necessary adjustments
7. Delivering the final product

2. Industry: Information Technology

- Company Type: SaaS Tool Provider
- Process: Product Development

Developing a software-as-a-service (SaaS) product entails the following steps:

1. Assessing market demand
2. Defining product specifications
3. Backend programming
4. Collaborating with designers for frontend and user experience (UX) development

5. Crafting an onboarding experience
6. Conducting internal testing
7. Debugging and troubleshooting
8. Conducting beta testing
9. Gathering user feedback
10. Iterating and improving the product accordingly

1.6 My Dataset

In this subject, I would use a retail dataset to perform analysis and make decisions for the business.

The dataset contains retail data from various retailers across the United States, mimicking real-world retail complexities. It's valuable for research and training in predictive analytics within the retail industry, covering diverse aspects like customer demographics, product details, store information, and sales data.

With ~20,000 rows and 15 columns, each row represents a unique customer purchase. Here are the essential fields:

- CustomerID: A unique identifier for each customer.
- Age: The age of the customer.
- Gender: The gender of the customer.
- AnnualIncome: The customer's annual income in USD.
- SpendingScore: A score (out of 100) indicating spending behavior.
- ProductCategory: The category of the purchased product.
- ProductPrice: The price of the purchased product in USD.
- PurchaseDate: The date of purchase.
- StoreID: The store's ID where the purchase was made.
- StoreLocation: The location of the store.
- PaymentMethod: The payment method used by the customer.
- DiscountApplied: Whether a discount was applied to the purchase (True or False).
- DiscountPercent: The percentage of discount applied.
- ProductCost: The cost of the product to the retailer in USD.
- Profit: The profit made by the retailer on the sale in USD.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	CustomerID	Age	Gender	AnnualIncome	SpendingScore	ProductCategory	ProductPrice	PurchaseDate	StoreID	StoreLocation	PaymentMethod	DiscountApplied	DiscountPercent	ProductCost	Profit					
2	1	58	Male	60038	41	Health & Beauty	147.43	6/11/2022	46	San Jose	Credit Card	TRUE	26	109.1	38.33					
3	2	57	Male	31577	91	Health & Beauty	402.09	6/5/2023	53	Los Angeles	Mobile Payment	TRUE	1	398.07	4.02					
4	3	39	Female	117404	26	Groceries	958.45	10/14/2020	95	Philadelphia	Mobile Payment	FALSE	0	958.45	0					
5	4	33	Male	87434	94	Electronics	544.17	8/27/2021	24	Dallas	Credit Card	FALSE	0	544.17	0					
6	5	18	Male	90225	10	Health & Beauty	645.75	6/6/2023	2	San Antonio	Credit Card	FALSE	0	645.75	0					
7	6	27	Female	71051	74	Books	304.15	2/5/2022	93	San Diego	Debit Card	FALSE	0	304.15	0					
8	7	18	Male	116056	77	Health & Beauty	629.44	5/30/2023	83	San Jose	Cash	FALSE	0	629.44	0					
9	8	19	Male	116897	7	Electronics	57.43	12/16/2022	61	Los Angeles	Cash	FALSE	0	57.43	0					
10	9	70	Female	140969	62	Electronics	237.6	2/11/2022	61	San Jose	Credit Card	TRUE	15	201.96	35.64					
11	10	27	Female	140161	26	Books	573.09	2/12/2021	69	San Diego	Online Transfer	TRUE	29	406.89	166.2					
12	11	23	Male	84415	45	Health & Beauty	738.67	4/13/2021	81	San Jose	Debit Card	TRUE	11	657.42	81.25					
13	12	32	Female	126348	47	Books	320.18	7/26/2020	62	Philadelphia	Debit Card	FALSE	0	320.18	0					
14	13	55	Male	100528	65	Home & Kitchen	536.86	10/31/2020	98	Phoenix	Mobile Payment	FALSE	0	536.86	0					
15	14	57	Male	38744	24	Health & Beauty	837.39	2/12/2023	16	Philadelphia	Online Transfer	TRUE	12	736.9	100.49					
16	15	38	Male	52343	43	Electronics	870.01	10/21/2020	21	San Diego	Cash	FALSE	0	870.01	0					
17	16	31	Male	37183	21	Books	580.08	9/20/2022	56	Philadelphia	Debit Card	TRUE	30	406.06	174.02					
18	17	27	Female	136739	13	Health & Beauty	434.31	4/13/2021	88	San Antonio	Credit Card	FALSE	0	434.31	0					
19	18	18	Male	95791	20	Home & Kitchen	46.38	10/26/2021	98	Dallas	Cash	FALSE	0	46.38	0					
20	19	28	Male	48190	47	Clothing	798.74	12/2/2022	10	Chicago	Mobile Payment	TRUE	12	702.89	95.85					
21	20	55	Male	23490	41	Health & Beauty	991.35	9/25/2021	93	Houston	Online Transfer	FALSE	0	991.35	0					
22	21	30	Male	35647	93	Health & Beauty	728.66	1/25/2022	73	Philadelphia	Debit Card	TRUE	3	706.8	21.86					
23	22	45	Female	70243	58	Groceries	830.95	2/19/2022	17	Dallas	Mobile Payment	FALSE	0	830.95	0					
24	23	47	Male	91865	8	Groceries	107.33	7/2/2021	54	San Diego	Cash	TRUE	14	92.3	15.03					
25	24	30	Female	41065	48	Clothing	63.61	4/28/2023	32	Philadelphia	Mobile Payment	FALSE	0	63.61	0					
26	25	67	Female	42708	32	Home & Kitchen	321.59	3/31/2021	66	San Diego	Cash	FALSE	0	321.59	0					
27	26	21	Female	110548	14	Home & Kitchen	430.07	11/24/2021	31	Dallas	Online Transfer	TRUE	20	344.06	86.01					
28	27	19	Female	146371	26	Electronics	401.87	5/5/2023	86	Chicago	Cash	FALSE	0	401.87	0					
29	28	69	Male	144077	20	Electronics	658.37	5/2/2023	44	Phoenix	Online Transfer	TRUE	25	493.78	164.59					

Figure 3. Retail Dataset

II. Unstructured and Semi-Structured Data (M1)

2.1 What is Structured Data

Structured data refers to information that has been organized into a well-defined format or model, making it easily searchable and accessible. In this format, data is arranged into predefined fields, allowing for efficient extraction and analysis using tools like SQL. A common example of structured data is found in relational databases, where data is stored in tables consisting of rows and columns.

The structured nature of this data minimizes redundancy, making it less prone to errors and easier to manage. However, it also means that structured data is more rigid and less adaptable to changes compared to other data formats.

Examples of structured data include machine-generated data such as point-of-sale information (e.g., quantity sold, barcodes) and web log statistics. Human-generated data, such as information stored in spreadsheets, also falls under this category. The organized structure of this data simplifies analysis and retrieval, making it a valuable resource for decision-making and insights.

	A	B	C	D	E	F	G
1	Purchase ID	Last name	First name	Birthday	Country	Date of purchase	Amount of purchase
2	1	Davidson	Michael	04/03/1986	United States	10/12/2016	37
3	2	Vito	Jim	09/01/1994	United Kingdom	02/02/2016	85
4	3	Johnson	Tom	23/08/1972	France	02/11/2016	83
5	4	Lewis	Peter	18/10/1979	Germany	22/11/2016	27
6	5	Koenig	Edward	13/05/1983	Argentina	26/03/2015	43
7	6	Preston	Jack	16/06/1991	United States	06/11/2016	77
8	7	Smith	David	11/03/1965	Canada	15/11/2016	23
9	8	Brown	Luis	03/09/1997	Australia	03/07/2015	74
10	9	Miller	Thomas	07/01/1980	Germany	07/11/2016	13
11	10	Williams	Bill	26/07/1960	United States	20/11/2015	80
12	11	Gemini	Alexia	12/09/1995	Canada	11/03/2017	35
13	12	Bond	James	25/02/1975	United Kingdom	12/08/2017	40
14	13	Burgle	Patricia	01/12/1990	United States	18/01/2015	55
15	14	Reding	Michelle	07/04/1985	Canada	23/02/2017	28
16	15	Harvey	Billy	14/07/1971	United Kingdom	12/01/2016	41
17							

Figure 4. Example of Structured Data

2.2 What is Semi-Structured Data

Semi-structured data falls between the categories of structured and unstructured data, possessing some consistent characteristics but lacking a rigid structure typical of relational databases. Although semi-structured data does not adhere to strict formatting rules, it often incorporates organizational properties like metadata or semantic tags to enhance manageability, albeit with some variability and inconsistency.

Examples of semi-structured data include:

- Delimited files: These files contain elements that can be used to break down the data into separate hierarchies, providing a degree of organization while allowing for flexibility in data structure.
- Digital photographs: While the image itself lacks a predefined structure, certain attributes such as geotags, device IDs, and timestamps provide some structure. Additionally, users can assign tags to images, such as 'pet' or 'dog,' to further organize the data.
- Some instances of unstructured data may be classified as semi-structured if they possess one or more classifying attributes, providing a partial level of organization despite the overall lack of structure.

2.3 What is Unstructured Data

Unstructured data refers to raw data that lacks a predefined organization or format, making it challenging to process due to its complex arrangement.

Examples of unstructured data include:

- Social media posts and comments
- Chat transcripts

- Satellite imagery
- IoT sensor data
- Emails
- Presentations
- Log files with unstructured content

Organizing and managing unstructured data often involves using tools such as natural language processing (NLP) to extract meaningful information from written formats.

Unlike structured data, which follows predefined data models and is easy to analyze, unstructured data does not adhere to specific formats and is therefore more challenging to interpret.

Businesses utilize unstructured data analysis to extract useful insights, such as predicting consumer behavior based on social media activity or detecting patterns in scam emails. Storing unstructured data in data warehouses or data lakes facilitates further analysis and decision-making processes.

For example, there is a wide array of forms that make up unstructured data such as email, text files, social media posts, video, images, audio, sensor data, and so on.

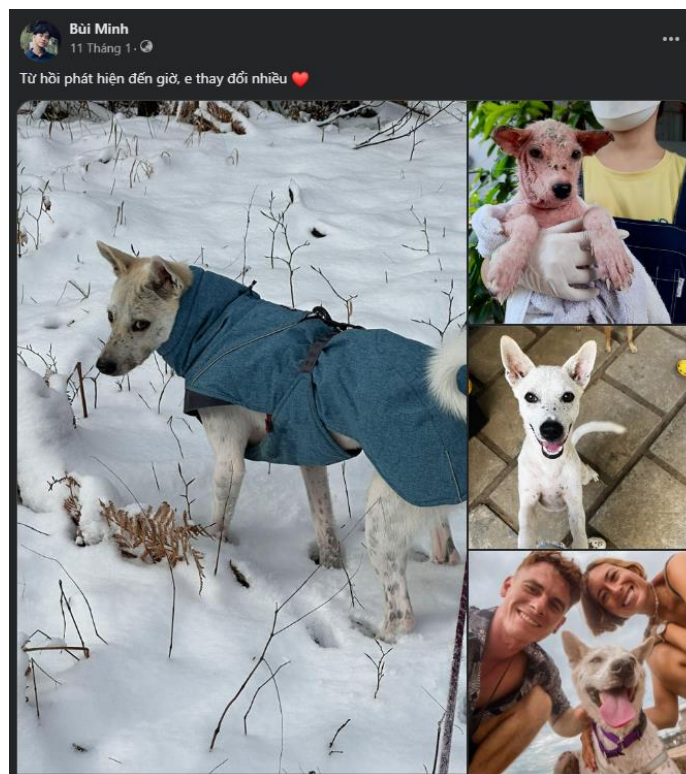


Figure 5. Example of Unstructured Data

2.4 Highlight Differences

Table 1. Types of Data Comparison

Properties	Structured data	Semi-structured data	Unstructured data
Technology	It is based on Relational database table	It is based on XML/RDF (Resource Description Framework).	It is based on character and binary data
Transaction management	Matured transaction and various concurrency techniques	Transaction is adapted from DBMS not matured	No transaction management and no concurrency
Version management	Versioning over tuples, row, tables	Versioning over tuples or graph is possible	Versioned as a whole
Flexibility	It is schema dependent and less flexible	It is more flexible than structured data but less flexible than unstructured data	It is more flexible and there is absence of schema
Scalability	It is very difficult to scale DB schema	It is scaling is simpler than structured data	It is more scalable.
Robustness	Very robust	New technology, not very spread	—
Query performance	Structured query allow complex joining	Queries over anonymous nodes are possible	Only textual queries are possible

III. Evaluation of Application Software for Business Processing (D1)

3.1 What is Application Software?

3.1.1 Definition

Application software refers to a comprehensive set of defined data, programs, procedures, instructions, and documentation designed to execute various operations upon user request. It enables end-users to interact with computer systems and is often referred to as end-user programs or simply applications. These software programs facilitate a wide range of tasks, both simple and complex.

At its core, application software consists of instructions aimed at altering the state of computer hardware. These instructions can be represented in various forms, ranging from low-level assembly language to high-level programming languages that are compiled or interpreted into machine code.

Application software serves as the backbone of computer operations, dictating the actions, timing, and methods of execution for a computer system. Examples of application software include familiar

programs such as Microsoft Word, Google Chrome, and Adobe Photoshop, each tailored to perform specific tasks to meet user needs.

3.1.2 Difference between system software and application software

1. System software primarily manages system resources and serves as a platform for executing application software. It provides essential functionalities for the operation of computer hardware and acts as an intermediary between the hardware and the user-facing application software.

On the other hand, application software is designed to execute specific tasks or functions as requested by users. It encompasses a wide range of programs tailored to fulfill various user needs, such as word processing, web browsing, graphic design, and more.

2. Another key distinction is in the languages used for development. System software is typically built using low-level languages like assembly language, which directly interacts with hardware components. In contrast, application software is developed using high-level languages such as .NET, C++, Visual Basic, or Java, which offer greater abstraction and ease of programming.
3. Furthermore, system software is essential for operating computer hardware efficiently, while application software is focused on performing specific operations or tasks desired by users.
4. In terms of complexity, system software programming tends to be more intricate due to its direct interaction with hardware components and system-level functionalities. Conversely, application software is generally more straightforward and easier to understand, as it is designed to cater to specific user needs.
5. System software can operate independently and provide a platform for running application software. However, application software relies on system software for its execution and is dependent on the underlying system environment for proper functioning.

3.2 Types of Application Software

3.2.1 General Application Software

General application software encompasses a wide array of programs that fulfill fundamental user tasks and needs. These software applications are versatile and can perform various functions necessary for day-to-day operations. They are available either as standalone programs or as part of comprehensive application suites. Examples of general application software include Apache OpenOffice, WPS Office, and MS Office.

Word Processing Software

Word processing software enables users to create, edit, format, and customize text documents. They offer additional features such as Word Art and thesauruses to enhance document presentation. Word processing applications also facilitate tasks like publishing and sending emails, making them suitable for creating reports, manuals, and newsletters. Examples of word processing software include WordPad, Open Office Writer, and MS Word.



Figure 6. MS Word Software

Spreadsheet Software

Spreadsheet software allows users to perform calculations and organize data in tabular formats with rows and columns. Users can input data such as dates, times, and numbers and apply various formulas and functions for calculations. Additionally, spreadsheet applications offer features like tables, graphs, and charts, making them invaluable tools for financial sectors and businesses. Examples include LibreOffice Calc, Google Sheets, and MS Excel.

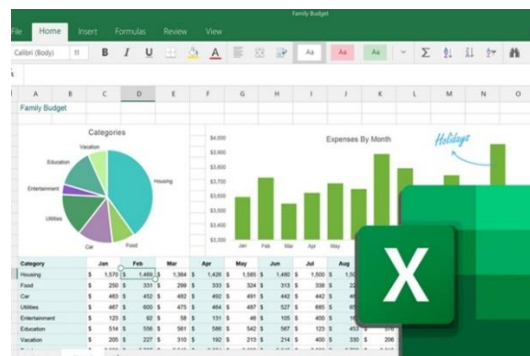


Figure 7. MS Excel Software

Database Software

Database software, also known as Database Management Systems (DBMS), enables users to create, edit, and extract data stored in an organized manner. These tools assist in managing various data types such as email IDs, phone numbers, and catalogs. Examples of database software include SQL, Oracle, and dBASE.



Figure 8. Database illustration

Presentation Software

Presentation software allows users to create slideshows to present ideas and projects effectively. These applications offer features like audio files, video files, charts, and graphs to enhance presentations. Examples include MS PowerPoint and Pinnacle Studio.



Figure 9. Pinnacle Studio Software

Web Browsers

Web browser software enables users to access and navigate the World Wide Web or the internet. Users can view various types of content such as videos, images, and information freely available online. Popular web browsers include Google Chrome, Microsoft Internet Explorer, and Mozilla Firefox.



Figure 10. Famous Web Browsers

3.2.2 Customized Application Software

Customized application software is tailored to meet the specific requirements of individual organizations. In today's competitive market, many businesses opt for custom application software development to address their unique needs effectively. Unlike off-the-shelf software, customized applications are designed and developed based on the specific demands and preferences of the organization.

These custom software solutions are crafted to exclude unnecessary functionalities commonly found in generic applications, ensuring that the software aligns closely with the organization's processes and objectives. Due to their bespoke nature, these applications are not readily available for download or purchase from the internet.

When organizations opt for customized application software, they typically engage software developers or development teams to create the desired solution. These developers are responsible for delivering the software according to the client's requirements, along with any agreed-upon rights and terms. As a result, customized application software is often referred to as tailor-made software.

For instance, a salon may require a customized application software solution to manage appointments, track inventory, and handle customer billing efficiently. This tailored software would be specifically designed to meet the salon's unique operational needs and enhance its overall performance and productivity.

3.2.3 Business Application Software

Business application software encompasses a diverse range of applications designed to streamline and enhance various functions and operations within organizations. These software solutions play a crucial role in improving the accuracy, efficiency, and security of business operations across different departments and processes.

Modern businesses rely on a multitude of business applications to manage their day-to-day activities effectively. Some notable examples include:

- **Project Management Software Applications:** Tools like Slack, Asana, and Basecamp facilitate efficient collaboration, task management, and project tracking among team members, ensuring smooth project execution and timely delivery.
- **Communications Application Software:** Platforms such as Buffer, HootSuite, and Zoom enable seamless communication and interaction within teams, as well as with clients and stakeholders, fostering effective collaboration and information sharing.
- **Enterprise Resource Planning (ERP) Application Software:** Solutions like Odoo, Oracle, and Microsoft Dynamics integrate and automate core business processes such as finance, inventory management, supply chain operations, and human resources, providing organizations with centralized control and visibility over their operations.
- **Customer Relationship Management (CRM) Application Software:** CRM systems like Mailchimp, Zoho, and NetSuite help businesses effectively manage customer interactions, track sales leads, and analyze customer data to enhance customer satisfaction and drive sales growth.
- **Database Management Systems:** Database solutions such as MySQL, Microsoft SQL Server, and MongoDB provide robust data storage, retrieval, and management capabilities, supporting critical business functions such as data analysis, reporting, and decision-making.
- **Education Software:** Platforms like Skill Lake, Google Classroom, and Litmos offer e-learning and training solutions for organizations, facilitating employee skill development, compliance training, and knowledge sharing.
- **Human Resource Management Software (HRMS):** HRMS platforms like BambooHR and Gusto HR streamline HR processes such as payroll management, employee onboarding, performance evaluation, and leave management, improving workforce efficiency and engagement.

3.3 Benefits and Drawbacks of Using Application Software

3.3.1 Advantages

Investing in custom application software development offers numerous advantages for organizations, enabling them to enhance their operations, streamline processes, and achieve their business goals effectively. Some key benefits of application software include:

Enhanced User Experience:

- Custom application software allows organizations to tailor their systems to meet the specific needs and preferences of their users, resulting in a more intuitive and user-friendly experience.
- Integration with Customer Relationship Management (CRM) systems enables businesses to access up-to-date customer information, leading to improved customer service and prompt issue resolution.

More Flexibility:

- Application software provides the flexibility to integrate data from various sources into a centralized platform, enabling users to access and analyze information seamlessly.
- Centralized data management simplifies the process of generating reports and insights, saving time and enhancing operational efficiency.

Better Productivity:

- Customized software solutions help streamline workflows and automate repetitive tasks, allowing users to accomplish more in less time.
- For example, Robotic Process Automation (RPA) applications eliminate manual data entry and verification processes, leading to increased productivity and resource optimization.

Robust Data Security:

- Custom application software integrates advanced security measures to safeguard sensitive data and protect against potential threats.
- By partnering with experienced software service providers, organizations can ensure compliance with security standards and regulations, minimizing the risk of data breaches.

Decision-making Power:

- Centralized data management and analytics capabilities empower organizations to make informed decisions based on real-time insights and performance metrics.
- Customized software solutions enable organizations to monitor data, analyze trends, and forecast future outcomes, facilitating proactive decision-making and strategic planning.
- With timely access to comprehensive data, businesses can respond quickly to market changes, identify opportunities, and stay ahead of the competition.

3.3.2 Disadvantages

While application software offers numerous benefits, there are also some potential disadvantages that organizations should consider:

High Initial Investment:

- Custom application software development typically involves a significant upfront investment in terms of time, resources, and costs.
- The process of designing, developing, and implementing custom software solutions can be complex and time-consuming, requiring skilled professionals and specialized tools.

Time-Consuming Development Process:

- Developing custom application software often requires a lengthy development process, especially for complex or highly specialized systems.
- Delays in the development timeline can occur due to unforeseen challenges, changes in requirements, or technical issues, potentially impacting project deadlines and objectives.

Maintenance and Support Costs:

- Custom software solutions require ongoing maintenance, updates, and technical support to ensure optimal performance and address any issues or bugs that may arise.
- Organizations may incur additional costs for software maintenance, upgrades, and troubleshooting, especially if they rely on external service providers or consultants.

Compatibility Issues:

- Custom application software may face compatibility issues with existing systems, hardware, or software dependencies within the organization.
- Integrating custom software with legacy systems or third-party applications can be challenging and may require additional customization or development efforts.

Limited Scalability:

- Custom software solutions may have limited scalability, particularly if they are not designed with future growth and expansion in mind.
- As business needs evolve and user requirements change, organizations may encounter scalability challenges, leading to performance issues or the need for costly system upgrades.

3.4 Application Software Examples

Microsoft Products:

- MS Word: A word processing software for creating and editing documents.
- PowerPoint: Presentation software for creating slideshows and presentations.
- Excel: Spreadsheet software for organizing, analyzing, and visualizing data.
- MS Office: A suite of productivity tools including Word, PowerPoint, Excel, Outlook, and more.

Music Application Software:

- Spotify: A digital music streaming service offering access to a vast library of songs and playlists.
- YouTube Music: A music streaming platform providing access to official songs, albums, and music videos.
- Apple Music: A subscription-based music streaming service with a large catalog of songs and curated playlists.

Communication Application Software:

- Skype: A telecommunications application providing video chat, voice call, and messaging services.
- Google Meet: A video conferencing platform for virtual meetings and collaboration.
- Zoom: A cloud-based video conferencing and webinar platform for online meetings and webinars.

Team Collaboration Software:

- Slack: A messaging platform for team communication and collaboration, offering channels, direct messaging, and integrations with other tools.
- ClickUp: A project management and productivity platform for organizing tasks, projects, and teams.
- Wrike: A work management and collaboration platform for teams to plan, track, and manage projects.

Internet Browsers:

- Opera, Safari, Google Chrome, Internet Explorer, Mozilla Firefox: Web browsers for accessing and navigating the internet, browsing websites, and running web applications.

Multimedia Software:

- Windows Media Player: A media player for playing audio and video files on Windows operating systems.
- VLC Player: A versatile media player capable of playing various multimedia formats across different platforms.

COMPARISON

I. Support for Business Decision-Making at Different Organizational Levels (P2)

1.1 Decision-Making Definition

Decision-making involves selecting from various options, including the choice to take action or refrain from it. In every organization, decisions possess the power to reshape the company's trajectory, often with far-reaching and sometimes irreversible consequences for employees, stakeholders, and all parties involved.

The decision-making process varies depending on the scale of the company. In smaller organizations, where roles are more clearly defined, decision-making tends to be more straightforward. However, in larger companies, decisions are made at various levels, necessitating a structured approach to the decision-making process. Proper design and enforcement mechanisms are crucial for ensuring effective decision-making across different levels within the organization.



Figure 11. Decision-Making illustration

1.2 Decision-Making Levels

There are three broad categories of managerial decisions:

Strategic Decisions:

- These decisions have a significant impact on the entire business enterprise and contribute directly to achieving its overarching goals.
- They often involve long-term implications and may require major departures from previous practices.
- Strategic decisions are typically made at the higher levels of management and involve applying business judgment, evaluation, and intuition.
- Examples include decisions related to the election of officers, equity grants, annual budgets, and long-term strategies.

Tactical Decisions:

- Tactical decisions focus on implementing strategic decisions and are aimed at developing divisional plans, structuring workflows, and acquiring resources.
- These decisions are made at the middle management level and involve considerations such as workforce size, sales and marketing strategies, and work assignments.
- Examples include decisions related to workforce structure, sales strategies, and non-disclosure agreements.

Operational Decisions:

- Operational decisions pertain to day-to-day operations of the enterprise and have a short-term horizon, as they are made repetitively.
- They are based on factual information and do not require significant business judgment.
- Operational decisions are made at lower levels of management and focus on tasks such as scheduling employees, training, and purchasing office supplies.



Figure 12. Decision-Making Levels

1.3 Comparison

Table 2. Decision-Making Levels Comparison

Aspect	Strategic Support	Tactical Support	Operational Support
Nature of Decisions	Long-term, significant impact	Implementing strategies	Day-to-day tasks
Support Mechanisms	ESS, BI tools, scenario analysis	DSS, project management software	TPS, ERP systems
Features	Long-term forecasting, scenario planning	Data analysis, project planning	Routine task automation, real-time processing
Examples	ESS dashboards, BI tools	DSS, project management software	TPS, ERP systems
Scope	Long-term planning	Implementing strategies	Daily operations
Complexity	High complexity	Moderate complexity	Low complexity
Data Requirements	Extensive analysis, forecasting	Data analysis for strategy	Real-time transactional data
Decision-Making Autonomy	Top executives	Middle management	Front-line staff

II. Key Features of Business Intelligence Functionality (M2)

2.1 What is BI Tools

Business intelligence tools refer to software applications designed for collecting, storing, and analyzing data sourced from various channels, including transactional databases, spreadsheets, and social media platforms.

These tools process and present data in user-friendly formats such as charts, graphs, maps, or other visualizations, making complex information easier to comprehend.

Organizations leverage BI tools in multiple ways. For instance, they can monitor sales figures, assess customer satisfaction levels, analyze social media interactions, evaluate website traffic, and more.

Furthermore, BI tools aid in recognizing patterns and anomalies within data sets. They also facilitate forecasting future outcomes and providing recommendations for actions based on these predictions.



Figure 13. BI illustration

2.2 Features of business intelligence

Data Visualization:

Harness the power of visual representations to grasp insights with ease. BI tools empower users to discern patterns and trends through visually appealing charts, graphs, and heatmaps, which can be tailored to suit specific needs.

Data Discovery:

Embark on a journey of exploration sans coding. Data discovery functionality enables users to swiftly uncover valuable insights by leveraging natural language processing (NLP) to sift through data effortlessly. Queries posed in plain English yield results efficiently, saving valuable time and effort.

Data Mining:

Unearth hidden treasures within vast datasets through the process of data mining. Whether performed manually or aided by machine learning algorithms, BI tools with data mining capabilities facilitate the identification of elusive trends and patterns, aiding in informed decision-making.

Ad-hoc Reporting:

Break free from the confines of predefined reports with ad-hoc reporting. This feature empowers users to generate custom reports on the fly, enabling quick access to pertinent information from any dataset.

Data Warehousing:

Centralize and organize disparate data with data warehousing. This facilitates seamless data access and serves as a single source of truth for the organization, accommodating historical and current data to track long-term trends effectively.

Predictive Analytics:

Harness the power of past data to forecast future outcomes with predictive analytics. BI tools equipped with predictive analytics capabilities aid in making informed decisions, predicting phenomena such as customer churn and future sales trends.

Real-time Data:

Stay abreast of ongoing developments with real-time data capabilities. Constantly updated data provides current insights into business operations, enabling agile decision-making to respond promptly to dynamic scenarios.

Collaboration:

Foster effective teamwork with collaboration features embedded within BI tools. Real-time communication and data sharing capabilities empower teams to work together seamlessly, driving collective efforts towards achieving common goals.

Mobile Device Compatibility:

Access critical business insights on the go with BI tools optimized for mobile devices. Whether you're a sales manager or a field operative, mobile compatibility ensures uninterrupted access to vital data, enabling informed decision-making anytime, anywhere.

Scalability:

Future-proof your BI infrastructure with scalable solutions that grow alongside your organization. Whether you're a startup or an established enterprise, scalable BI tools adapt to increasing workloads, ensuring seamless performance as your organization evolves and expands.

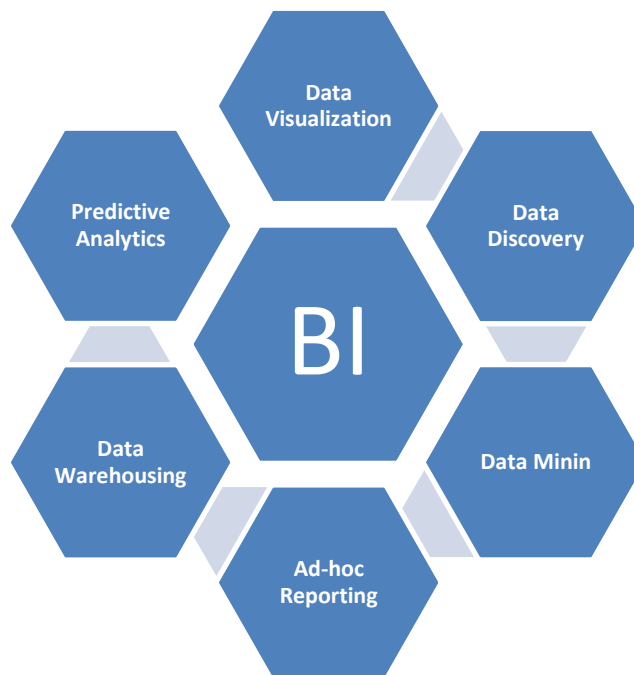


Figure 14. Features of business intelligence

2.3 Specific examples

These examples showcase a variety of key features of business intelligence functionality, including data visualization, ad-hoc reporting, predictive analytics, real-time data monitoring, and collaboration capabilities.

Data Visualization:

- Example: A retail manager uses BI tools to create interactive dashboards displaying sales performance across different product categories. Visualizations such as bar charts and heatmaps help identify top-selling items, trends over time, and geographical sales distribution.

Ad-hoc Reporting:

- Example: A financial analyst generates ad-hoc reports using BI tools to analyze quarterly revenue trends. By customizing report parameters such as timeframes, revenue sources, and geographic regions, the analyst can quickly gather insights tailored to specific stakeholder inquiries or business needs.

Predictive Analytics:

- Example: An insurance company leverages BI tools with predictive analytics capabilities to forecast claim volumes and identify high-risk policyholders. By analyzing historical claim data and demographic factors, the company can proactively allocate resources and mitigate potential losses.

Real-time Data:

- Example: A logistics manager monitors shipment statuses in real-time using BI tools integrated with IoT sensors. By tracking vehicle locations, delivery times, and traffic conditions, the manager can optimize routes, allocate resources efficiently, and provide customers with accurate delivery estimates.

Collaboration:

- Example: A project team collaborates on a market research initiative using BI tools equipped with real-time collaboration features. Team members can share insights, annotate dashboards, and communicate via built-in chat functions, fostering synergy and alignment towards project objectives.

III. Comparison of Information Systems and Technologies (D2)

3.1 Identifying Information Systems that support Organisations

3.1.1 Operational Level

Transaction processing systems (TPS) are used to keep track of everyday business transactions. They're used by managers who handle daily operations. The main goal of a TPS is to provide quick answers to basic questions like:

- How many printers were sold today?
- How much stuff do we have in stock?
- What's the outstanding balance for John Doe?

By recording these daily transactions, a TPS helps give answers to these questions promptly.

The decisions made by managers using TPS are usually routine and straightforward.

The information provided by TPS is very detailed.

For example, if someone applies for a loan at a bank where their employer has an agreement with the bank, the operational staff only needs to check the submitted documents. If everything meets the requirements, the loan application is processed. If not, the client is directed to higher management to discuss the possibility of making an agreement.

Some examples of TPS include:

- Point of Sale Systems: Records daily sales
- Payroll Systems: Manages employee salaries and loans
- Stock Control Systems: Keeps track of inventory levels
- Airline Booking Systems: Manages flight bookings

3.1.2 Tactical Level

Management Information Systems (MIS) are tools used by managers to keep an eye on how well the organization is doing right now. They take information from transaction systems and use it to create reports.

These reports help managers understand what's going on in the organization. They analyze the data to see trends and make predictions about the future. For example, if a point of sale system shows that certain products are selling well, the MIS can help decide how much more of those products to order.

Examples of MIS include:

- Sales management systems: They use data from point of sale systems.
- Budgeting systems: They show how money is spent in the organization.
- Human resource management systems: They look at employee welfare and turnover.

Managers use MIS to make decisions based on the information they have. For instance, they might predict how much inventory to order for the next quarter based on sales from the current one.

3.1.3 Strategic Level

Decision Support Systems (DSS) are tools used by top-level managers to make important decisions that don't happen every day. They gather information from both inside and outside the organization.

The main goal of DSS is to find solutions to complex and changing problems. They help answer questions like:

- What will happen if we increase production at the factory?
- How will our sales be affected if a new competitor comes into the market?

DSS use advanced math and statistics to find answers. They're designed to be very interactive, so managers can explore different scenarios.

Examples of DSS include:

- Financial planning systems: They help managers figure out the best way to achieve their goals. For example, they can calculate how changes in sales or expenses will affect the company's profit.
- Bank loan management systems: They check the credit of loan applicants and predict if the loan will be paid back.

3.2 Identifying Technologies that support Organisations

3.2.1 Artificial intelligence

Artificial intelligence (AI) systems are like smart robots that learn from data to figure things out, just like humans do. Big companies like Amazon, Facebook, and Google use AI to give you personalized recommendations and make their services better for you.

For example, Facebook suggests friends you might know based on the information you and your friends share. Amazon recommends products you might like based on what you've bought before. And Google shows you search results that are most helpful to you based on what you've searched for in the past and where you are.

These companies are super successful because AI helps them give you exactly what you need, making your experience better.

3.2.2 Online Analytical Processing (OLAP)

Online Analytical Processing (OLAP) is like a super-powerful tool for digging into data and understanding it better. Imagine a company that sells laptops, desktops, and mobile devices in different regions. OLAP helps you look at all the sales data from different angles.

For example, you can use OLAP to see how many laptops were sold in each branch and compare it to how many were expected to sell. Each piece of info, like the product type or number of sales, is a different angle you can look at the data from.

The goal of OLAP is to give quick answers to any questions you have about the data, no matter how big the data is.

3.3 Comparing and Contrasting types of information systems

3.3.1 Similarities of Information Systems

TPS, **MIS**, and **DSS** have similarities in that they focus on short to mid-term planning for organizations. **TPS** handles day-to-day transactions, while **MIS** and **DSS** tackle mid-term tasks like budget analysis and performance evaluation.

Furthermore, **TPS**, **MIS**, and **DSS** serve as inputs for Executive Support Systems (**ESS**), which generate forecasts and strategic insights. **TPS** provides transaction data, **MIS** offers performance metrics, and **DSS** aids in non-routine decision-making.

Moreover, **MIS** and **DSS** share similarities in their inputs, both drawing from **TPS** data. This includes daily transaction information like sales and inventory flow, in addition to other internal data sources.

3.3.2 Differences of Information Systems

Table 3. Information Systems Comparison

Aspect	Transaction Processing System (TPS)	Management Information System (MIS)	Decision Support System (DSS)
Timeframe	Provides daily transaction information	Provides performance information on a periodic basis	Used for non-routine decision making, as needed
User	Used by operational managers	Utilized by middle managers for decision support	Also utilized by middle managers for decision support
Level of Analysis	Least analytical	Moderately analytical	Most analytical

Table of Figures

Figure 1. Types of Business Process.....	6
Figure 2. Steps of Business Process	8
Figure 3. Retail Dataset.....	10
Figure 4. Example of Structured Data.....	11
Figure 5. Example of Unstructured Data	12
Figure 6. MS Word Software.....	15
Figure 7. MS Excel Software	15
Figure 8. Database illustration.....	15
Figure 9. Pinnacle Studio Software.....	16
Figure 10. Famous Web Browsers	16
Figure 11. Decision-Making illustration.....	21
Figure 12. Decision-Making Levels.....	22
Figure 13. BI illustration.....	24
Figure 14. Features of business intelligence.....	25

Table of Tables

Table 1. Types of Data Comparison	13
Table 2. Decision-Making Levels Comparison.....	23
Table 3. Information Systems Comparison.....	29

Reference List

- Akash , K. (2020) What is business process? – types, benefits, and examples, *Fasproc Blog*, [online] Available at: <https://fasproc.com/blog/business-process/> (Accessed 28 March 2024).
- Naeem, T. (2023) Understanding structured, semi-structured, and unstructured data, *Astera*, [online] Available at: <https://www.astera.com/type/blog/structured-semi-structured-and-unstructured-data/> (Accessed 28 March 2024).
- AshishVishw (2023) Difference between structured, semi-structured and unstructured data, *GeeksforGeeks*, GeeksforGeeks, [online] Available at: <https://www.geeksforgeeks.org/difference-between-structured-semi-structured-and-unstructured-data/> (Accessed 28 March 2024).
- Chand, S. (2014) Decisions making: Strategic, tactical and operational decisions: Business Management, *Your Article Library*, [online] Available at: <https://www.yourarticlelibrary.com/information-technology/decisions-making-strategic-tactical-and-operational-decisions-business-management/10271> (Accessed 30 March 2024).
- Anon (n.d.) Domo Resource - 10 features of Business Intelligence Tools you never knew you needed, *Domo*, [online] Available at: <https://www.domo.com/learn/article/10-features-of-business-intelligence-tools-you-never-knew-you-needed> (Accessed 30 March 2024).
- Pitaliya, S. (2023) Types of application software: A Complete Guide for 2024, *Radixweb*, Radixweb, [online] Available at: <https://radixweb.com/blog/types-of-application-software> (Accessed 3 April 2024).
- Martin, M. (2024) Types of information system: MIS, TPS, DSS, Pyramid Diagram, *Guru99*, [online] Available at: <https://www.guru99.com/mis-types-information-system.html> (Accessed 5 April 2024).
- Ethan. (2017). Comparison of Transaction Processing System, Management Information System, and Decision Support System [Document]. Retrieved May 04, 2024