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Business Intelligence and Its Vital Role in E-Commerce

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ABSTRACT

Business intelligence has evolved to be an all-pervasive tool to conduct business and make future plans in today's times. With the large amounts of data that customers provide through online transactions and cashless payments, the study of their buying trends, tastes, behavior can be analyzed to minute depths. As the dynamics of business environments is fast changing, and so as the costumers needs, there arose a huge amount of specific relevant data that take a lot of time and efforts for analysis, information gathering, and knowledge creation towards intelligent decision making. This has opened the doors widely for the data mining procedures to sort out the relevant business data from the irrelevant. Moreover the development in other software systems has added a new dimension; the inception of Business Intelligence (BI) towards upgrading the performance of business companies. The aim of this study is to evaluate how effective role business intelligence play in e-commerce, Business Intelligence is an emerging area of study that involves the usage of big data to identify trends, patterns and form strategies for business. This future plan of action can be growth or expansion oriented, or to promote. Business intelligence and market research almost always go hand in hand, as they are both forms of empirical studies based on historical data points. The key purpose, BI is to help enterprises in the process of decision making. As per studies, decisions based on evaluation of data provide a greater success rate (79%) as compared to decision made on intuitions. Business intelligence services effectively evaluate data and provide reports that enterprises can use for research purpose before developing strategies and models.

Keywords:-Business, Business intelligence, E-commerce,Vital, Effectiveness

INTRODUCTION

Business Intelligence

Business intelligence, often shortened to BI, is the practice of leveraging tools to access and sort data to present actionable insights about a business's strategic and tactical goals.

For example, a banking company might use a BI dashboard to analyze data about complaints they receive and sort them by location, account type, or time period. This would highlight shifts in the frequency of complaints, such as an increase in a specific city, and allow the business to investigate the causes.

Business intelligence can be leveraged to better understand a massive amount of data from a variety of tools, including sales automation, chatbots, logistics, inventory management, or any other number of data-generating actions.

Business Intelligence (BI) is a technology that gathers, breaks down and introduces business data and enormous information. The BI solutions & products, whenever executed effectively, spares you time and vitality while giving you essential data about your business and clients. Business Intelligence programming can take the majority of your crude information, comprehend it, and demonstrate to you the data that matters. Business knowledge enables organizations to settle on making progressively educated and better choices for marketing, sales, and various different fields of the business.

According to a study done by USA based research company Nucleus Research, $10.66 was made for every dollar that a company spent on Business Intelligence. That's an ROI of over 1,000%. The data picked up from business knowledge can enable your business to decrease expenses and to implement more efficient processes. Business Intelligence can help a business to generate more leads and to retain more clients for a longer period of time. Utilizing

business intelligence rather than manually entering business data can save a business from unnecessary expenses and time and can help to use business resources more efficiently.

In E-commerce businesses, the real-time data from the websites are stored in data warehouses and through the ETL process and those data are used to analyze the business using business intelligence. ETL – extract, transform and load – is the set of processes by which data is extracted from numerous databases, applications and systems, transformed as appropriate, and loaded into target systems – including, but not limited to, data warehouses, data marts, analytical applications, etc.
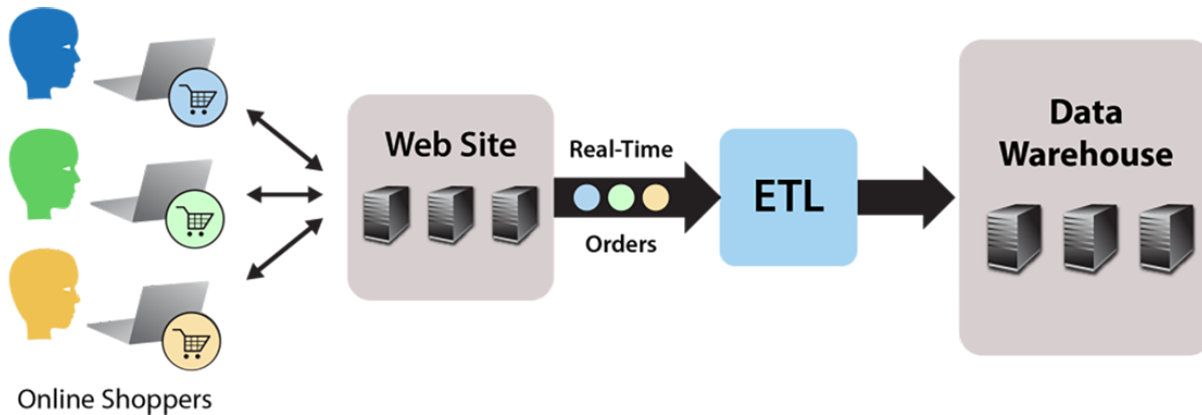
Business Intelligence Process from Scratch

Why E-Commerce businesses are adopting Business Intelligence

1. **Accurate Decision Making:** Business Intelligence allows E-commerce businesses to make decisions based on statistical facts. Those facts can be used to guide choices about future company growth by evaluating a long-term view of the market and competition.

2. **Driving Revenue:** Business Intelligence enables E-commerce companies to discover detailed sales trends based on their customers' preferences, reactions to promotions, online shopping experiences, purchasing behavior and patterns and trends which affect sales and leads to revenue maximization.

3. **Operational Efficiency:** Decreasing waste and improving profits is the goal of any business. Business intelligence looks at all types of data and can help the E-commerce businesses to find out where there are errors and quality issues in lost productivity in sales, customer attrition due to call center dissatisfaction, poor strategy due to badly analyzed market research, and an infinite array of other problems needing speedy and effective solutions. As such, data may be run through a variety of modules in order to assess where waste and improvements can occur and develop strategies for correcting these problems.

4. **Gaining Competitive Advantages:** Business Intelligence gives a 360-degree view of the customer to understand customer behavior, customer analysis, customer needs and providing the best according to that. Leveraging customer buying pattern business Intelligence permits E-commerce businesses to decide the best course of action to retain valuable customers and take advantage of missed sales opportunities.

5. **Managing Business, In-house & Spotting Problems:** Business Intelligence helps E-commerce businesses refine an assorted inventory and optimize supply quantities by analyzing detailed historical data such as buying patterns and the demographics of customers. It also minimizes the risk of out-of-stock situations by analyzing safety stock data and inventory and sales information to create accurate forecasts. Business intelligence provides valuable data that Predict over-stock situations before they become a major problem by drawing on replenishment, sales, and forecasting data.

Roles of Business intelligence for the E-commerce industry

There is some E-commerce specific Business Intelligence required to efficiently run an E-commerce business. However, most of the matrices are the same as those required by all businesses.

Some of the important reports related to E-commerce business are

1. **Top Performers in the Market:** Business Intelligence analyzes the Most profitable advertising campaigns, customers, segments and products based on data and gives the E-commerce business a clear view of how they should do their marketing.
2. **Trend Analysis:** Business Intelligence analyses the trends of changing customer preferences and behaviour to shape the E-commerce business.
3. **Margin Analysis:** Business Intelligence analyzes the Cost and profit. Business Intelligence list products and product lines, Areas where margins can be increased, price sensitivity and elasticity of demand.
4. **Live Marketing Reports:** Business Intelligence analyzes the Products included in the cart, abandoned carts, search terms used, the response of the newsletter, etc.and gives live marketing report.
5. **Live Sales Report:** Sales Analysis, sales, returns, taxes, shipping, refunds, discount coupons, promotional offerings, credit card collection into formations can get live with Business Intelligence.
6. **Inventory Reports:** Items sold, available quantities, items to be reordered, new items, orders in hand and on order, inventory in transit and much more are analyzed by business intelligence for better inventory management.

There are so many Business Intelligence tools using which the E-commerce businesses can generate more insights about their business and can project the future of the business more efficiently.

How does ecommerce BI work?

When working with online retailers, we at ScienceSoft usually set up a solution that allows:

- **Data integration**

For starters, your data is gathered from all the necessary data sources – an ecommerce solution, CRM, marketing tools, social networks, etc. into the central repository to be further mined for actionable insights.If you don't have any facility to store all that data in one place, you'll have to build a data warehouse (DWH) either in the cloud or on-premises. My colleague Alex Bekker, Head of Data Analytics Department at Science Soft, illustrated the peculiarities of data warehouse design for both options in the article dedicated to data warehouse design, so feel free to explore it if you need more details on that issue.Although both options offer certain benefits, I recommend going for a cloud DWH due to its fast deployment and the absence of hardware-related costs. As for your data privacy in the cloud, it will be safe with the leading cloud service providers, such as AWS, Microsoft Azure, and Google, which apply strict security measures to stored data. Additionally, I recommend securing your cloud-based BI solution with data anonymization, data encryption, and more in the course of the development. After the deployment, consider setting up user access rights and having your BI solution checked with regular vulnerability assessment and penetration testing.

- **Data quality management**

For you to achieve a state of high data quality and consequently obtain the high quality of analytics insights, data quality management procedures should be given the highest priority. The main stages of the data quality management process involve:

- Determination of data quality thresholds and rules.
- Assessment of data quality.
- Resolution of data quality issues.
- Control and monitoring of data quality.

Operating in different working environments and in pursue of meeting its unique needs, each company has to develop its own customized approach to data quality management.

Approach to fostering ecommerce BI

Drawing on my experience, I may say that the best way to promote ecommerce business intelligence in your company is to use the agile approach to developing your ecommerce BI solution. Its concept can be presented with the following steps:

- Defining the burning needs to be satisfied with ecommerce BI.
- Developing an ecommerce BI solution to facilitate ad-hoc optimization and working on its adoption.
- Enhancing the solution with self-service analytics capabilities after the first tangible outcomes. You can enable self-service analytics with such software as Power BI, Tableau, Qlik Sense, etc.
- Reinforcing the solution with advanced analytics capabilities for getting deeper insights.

E-commerce and the changing face of business

The traditional marketplace has evolved to a great extent in today's world of globalization and computerization. Customers no longer need to visit physical stores to buy most of their requirements. The marketplace has moved towards a digital front, where buying and selling is online; and payments are cashless. Online transactions have proved to be a safe and convenient method of making payments, eliminating the need to carry cash for customers. E-commerce has simplified the marketplace, by aggregating suppliers and customers on online portals, websites, and mobile applications. The logistics and supply chain management techniques have also changed due to e-commerce and online transactions.

LITERATURE REVIEW

(BI) is defined as "the process of integration of data from disparate internal and external data sources, applying analysis tools and techniques to understand the information within the data, making decisions, and taking actions based on this gained insight" (Gangadharan and Swami, 2004, p.139). The importance of BI can be imagined by understanding the questions that why does BI continue retaining its top rating position and why have businesses not completed the implementation of BI-led application? (Bijker and Hart, 2013). Incorporation of information from disparate sources, message extraction from given information for and the decision making creates the value of BI application (Gangadharan and Swami, 2004, Dodson et al., 2008, Guarda et al., 2013). The above discussion represents that BI plays in significant role of a corporate performance management (Richards et al., 2011) by conducting information management and the decision making organizations need for conducting the changing environment. With regards to the information management, new and complex information emerging from constantly occurring changes in the environment open a challenge for SMEs. Therefore, organizations require assimilating and processing information for detecting the degree of effects of those changes that may help organizations to take the dynamic decision (Guarda et al., 2013). BI has been proliferated due to its effective application for disseminating, assimilating, and processing information businesses use to sense issues related to the decision making (Singh and Singh, 2013). For substantiality of the decision making, BI as an IS led application provides the appropriate level of data accuracy and confidentiality of information (Brinkhues et al., 2014) which produces relevant knowledge. Knowledge presents about what has happened; what is happening and what could happen (Stodder, 2013). According to Olszak Analysis of interaction between business intelligence and SMEs: learn from each other 155 JISTEM USP, Brazil Vol. 14, No. 2, May/Aug., 2017 pp. 151-168 www.jistem.fea.usp.br and Ziemba (2006), knowledge provides foundation of the decision making in relation to what to be done and how. Indeed, BI has become evident as logical enabler of information management that is a key necessity of the decision making. With regards to the decision making, BI creates the business value followed by customer cooperation, change adaptation, and speedy responsiveness to competitive requirements (Pourshahid et al., 2011). Furthermore, the decision making provides the cost deduction, flexibility of logistics, new technology adoption, business operation regulation (Harraf et al., 2015). Quality information becomes imperative for the quality decision (Ponelis and Britz, 2011, Citroen, 2011). Quality information emerges from a rigorous analysis between historical background and current environment (Ponelis and Britz, 2011, Citroen, 2011). Learning historical context and current situation provides the real source of knowledge extraction (Olszak and Ziemba, 2006). BI uses certain technologies (Singh and Singh, 2013) to integrate historical and current data recording, synthesises, data transformation into information, knowledge generation, and its exploitation into the decision making to improve the business potency (Gangadharan and Swami, 2004, Pourshahid et al., 2011). In essence, the discussion represents that BI becomes a leading factor of conducting the decision making associated with proper information management. The interrelation among BI, information management, and the decision making has been focussed with presenting the following figure. Figure 1. Role of BI As shown in figure 1, information management and the decision making have been acknowledged as two key necessities for conducting the changing environment. BI enables information dispersion reduction, user interaction, easy access to information, information dissemination in timely manner, and the decision making in relation to change adaptation in businesses (Popovic et al., 2012, Guarda et al., 2013). Although BI appears the corporate conductor of both necessities, information management has influence on the decision making. Because, information management provides structured information for the decision making (Rodionov and Tsvetkova, 2015).

SMEs and decision environment SMEs are defined as relatively small sized industries are (a) actively managed by their owners, (b) highly personalised, (c) largely local in their area of operations, and (d) largely dependent on internal sources of capital to finance their growth (Wiklund et al., 2009, Antlova, 2009,

Faitira et al., 2012). SMEs have been recognized for their growing contributions to a country's economic development (Wiklund et al., 2009, Apulu et al., 2011). The steady and increasing contribution of SMEs can be seen "in providing income generating activities thus increase the rate of growth of real per capita income, balance income distribution and improve economic stability" (Nkwe, 2012, p.29). They have been taking a large portion of the world economic development since 1940s (Ionita, 2013). However, owners/managers of SMEs continuously face a range of issues related to unexpected changes within the environment (e.g. market competition, technological innovation, and business dynamisms), (ZainunTuanmat and Smith, 2011, Cavalcante et al., 2011, Karanasios, 2011, Ponelis and Britz, 2011). Rapidity of technological upgrading accumulate new competitors, market, new products, and new business policy in a large network. The fast rate of technological transition creates the source of uncertainty, global competition, and competitive intensity for businesses (Harraf et al., 2015). On the other hand, competitive intensity influences new emergent in the technological sector, while factors such as market competition, business policy and global partnership are interconnected (Roldan et al., 2014). In effect, changes in customer interests, market demands, pricing, and supply chain management are evident (ZainunTuanmat and Smith, 2011, Cavalcante et al., 2011, Karanasios, 2011, Ponelis and Britz, 2011). Those changes offer both opportunities (such as flexibility, low cost networking, cost reduction, and rapid communication) (Guarda et al., 2013) and threates (e.g. information security threat, discontinuation of business order) (Trinh et al., 2012, Chen and Siau, 2012), which become the issue of business survivla and development of SMEs (Irjayanti and Azis, 2012). However, taking opportunities and encountering threats become a challeng for SMEs for adjusting businesses beyond those changes. Therefore, strategic decision making seems important that guides managers in this regard (Stodder, 2013). The decision making is defined as the selection of action and method managers/organizations use to conduct the changing environment associated with speedy responsiveness (Guarda et al., 2013). It is an integrated process of determining business performance measurement, differentiating decision problems, assimilating information, forecasting business future, and planning actions toward the desired performance (Singh and Singh, 2013). For effectiveness of the decision making, it is important to understand the decision environment. Decision environment considers the source of decision problem, decision goals, and relevant resources (Chai et al., 2013). Therefore, businesses are 154 Ali, S., Khan, S., Miah, S. J. JISTEM USP, Brazil Vol. 14, No. 2, May/Aug., 2017 pp. 151-168 www.jistem.fea.usp.br increasingly and largely depending on adequacy and accuracy of information supply chain (Keh et al., 2007). Indeed, information management appears important for the decision making in SMEs. Information management refers to managing requiring information supply chain, its assimilation, and its conversion into a meaningful form to creates its usability (Polasky et al., 2011). Information management provides the substantial approach in satisfying organizations' information based needs (Doucek, 2015). Because, information management provides originating, collecting, storing, recording, analyzing, synthesizing, and transforming information, which generate knowledge relevant to the decision making (Guarda et al., 2013, Roldan et al., 2014). Information management integrates three application for three impacts such as technology infrastructure satisfies material based needs, information organization creates its usability, and information administration for its actual use into the decision making application (Rodionov and Tsvetkova, 2015). Although it has been recognized for the decision making effectiveness, the study raises a concern to conduct information management in businesses. Thus, IS-led application becomes on necessity that may provide a rigor of information management for and decision support (Wixom et al., 2014). As earlier stated that BI has been signified as IS-led corporate application (Richards et al., 2011) that incorporates both information management for and the decision making support (Guarda et al., 2013).

METHODOLOGY

Objective: -To study the effectiveness ofbusiness intelligence in e-commerce.

Literatures helps to assess and identify that how much business intelligence is being used in e-commerce

Research design: - Probability sampling techniques is used to know about to what extend Business intelligence works in e-commerce.

Sampling procedures probability and convenient sampling

Secondary data: - It consists of information that already exist and that was collected in the past of some other purposes.

International journals, researches E-books and other information which have been used before someone else**.**

ANALYSIS / INTERPRETATION OF STUDY

**Business Intelligence for All Business Sizes**

Business intelligence is not just for large companies. In recent years, cloud computing has made business intelligence far more affordable for small companies. Using BI dashboards and analytics can give smaller businesses the insights they need to scale faster — and make them more competitive.

For example, a small company could gain insights into:

● Use a BI dashboard tool to track how many products were sold in a specific time period and the total profit generated by the product.

● Use an email tracking tool to see how many emails were opened, then import that data into a BI dashboard to see how a high open-rate impacts sales.

E-commerce Businesses Are Adopting Business Intelligence

In 2104, 1.5 billion people shopped online. By 2021, there will be an estimated 2.14 billion online shoppers around the world.
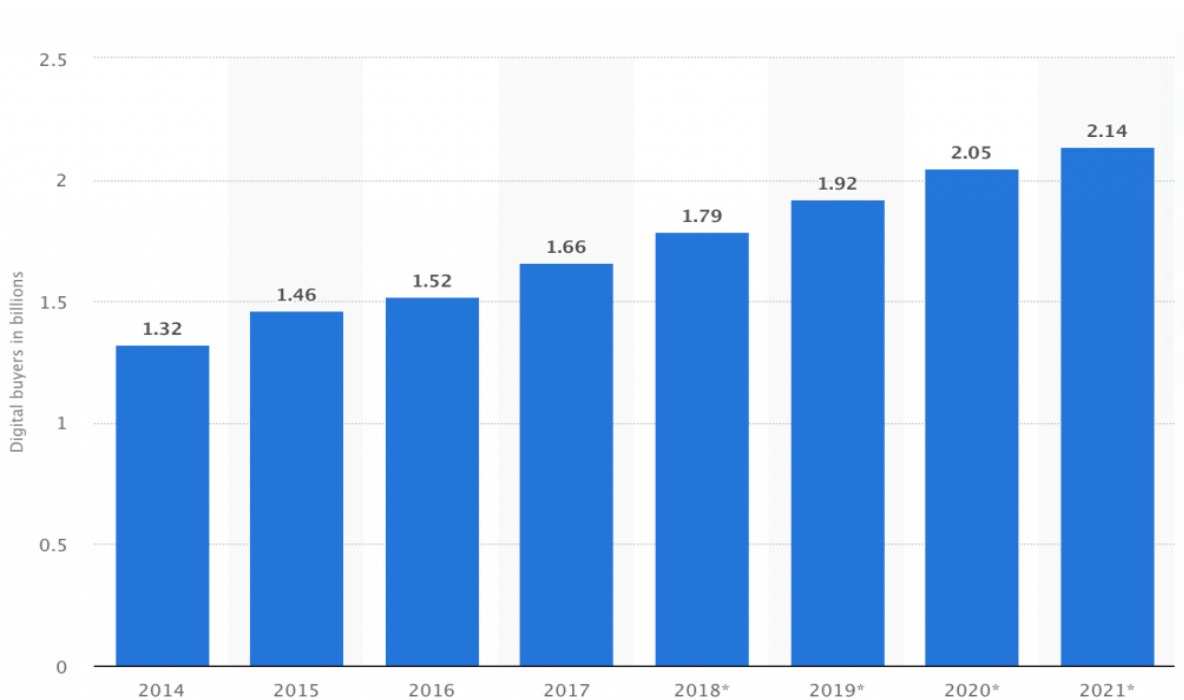
That explosion of online shopping provides e-commerce companies with an opportunity — but not all businesses will be able to rise to the occasion.

However, the most successful e-commerce businesses are already leveraging BI to help:

1. Accurate decision-making

Business Intelligence allows e-commerce businesses to make decisions based on statistical facts, rather than guesses. For example, a company could see how many customers abandon their cart and analyze data to understand why.

2. Drive revenue

BI gives access to sales trends based on customers' preferences, reactions to promotions, online shopping experiences, purchasing behavior, and other patterns and trends that impact sales. All of this information can help e-commerce stores maximize revenue.

3. Operational efficiency

Business intelligence looks at all types of data and can help the e-commerce businesses uncover errors and quality issues that result in lost productivity in sales, customer attrition due to call center dissatisfaction, higher bounce rates, and so forth. This data makes it easier for companies to uncover — and fix — bottlenecks.

4. Gaining a competitive advantage

Data helps companies understand what strategies work— and what doesn't. Using reports and benchmarking, e-commerce businesses can uncover opportunities for improvement, providing them with a competitive edge.

5. Managing business and spotting problems

BI allows businesses to get a high level or detailed view of data. This makes it far easier to spot challenges as they arise — but before they impact the bottom line. For example, a rise in churn may be noticed when it first starts to increase, rather than after the company has lost half its income.

Using Business Intelligence in E-commerce

E-commerce is fast becoming a critical component of our global economy, and business intelligence can be leveraged to help your company take advantage of that growth.

Here are a few of the most useful reports to better understand your business and your customers.

1. Inventory report

BI powered inventory reports can track not just what you have in inventory, but also where that inventory is located, how long it will last, and the overall value. Reports can be sorted by day, week, month, or year to inform critical supply and ordering decisions.

2. Sales report

When it comes to sales, data can make all the difference. BI can help your business track the performance of individual salespeople, the number of total leads, qualified leads, where those leads come from, and which months most sales are made.
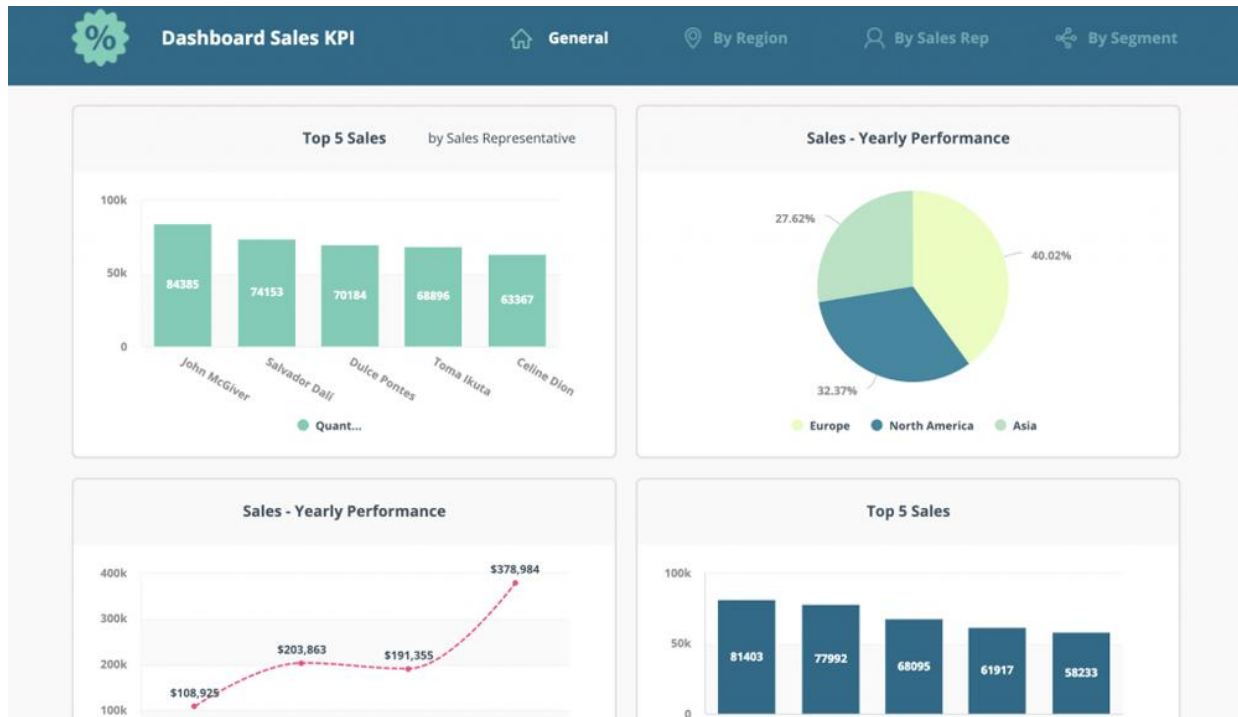
3. Margin analysis

If you are wondering how much a specific product makes you, then you will look at data about profit margin. Using BI, you can see how margin applies across accounts, locations, channels, and much more. This data can help businesses hone in on their most profitable customers and build a business plan to increase overall profit.
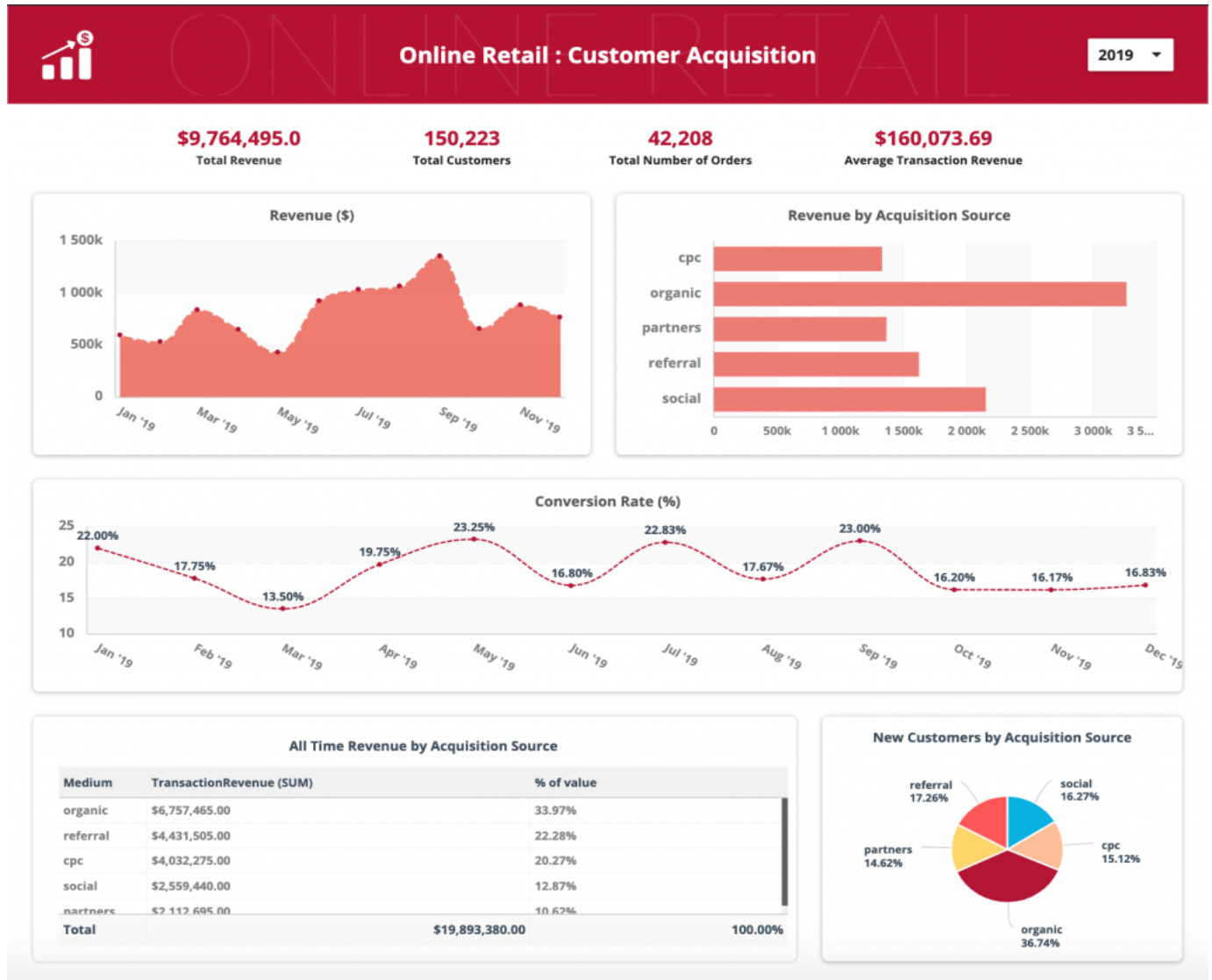
4. Marketing report

Marketing strategies like PPC and SEO create a ton of data. However, that data often remains siloed in the tool that gathers it. BI allows brands to pull all that data into one tool where it can be analyzed and leveraged.

. **The Future Scope of Business Intelligence**

BI is already helping e-commerce businesses make strategic business decisions faster. However, as technology continues to evolve, what can businesses expect? Machine Learning and AI will allow BI software to become increasingly self-sufficient in the coming years.

Other trends e-commerce companies should be on the lookout for include increased collaboration, integration, data usage, and the ability to store far more data than ever before using cloud-based storage solutions.

Online Retail : Customer Acquisition — 2019

| $9,764,495.0 Total Revenue | 150,223 Total Customers | 42,208 Total Number of Orders | $160,073.69 Average Transaction Revenue |

All Time Revenue by Acquisition Source

Medium	TransactionRevenue (SUM)	% of value
organic	$6,757,465.00	33.97%
referral	$4,431,505.00	22.28%
cpc	$4,032,275.00	20.27%
social	$2,559,440.00	12.87%
partners	$2,112,695.00	10.62%
Total	**$19,893,380.00**	**100.00%**

CONCLUSION

Business Intelligence (BI) is a combination of strategies and best-in-class technologies that provide the most important information about the business and consumers to enterprises. It allows enterprises to store raw data, process it, and avail selected information while saving time and energy. Besides, it is also helping enterprises to get more informed, and assists in making the process of decision making efficient.

BI's ability to evaluate useful data has enticed many Ecommerce ventures. According to the leading business intelligence consultants, specialized BI tools have the ability to revolutionize the working models of ecommerce businesses.

Timely and accurately available data is the driving factor that determines the success of any ecommerce business. Many business intelligence service providers develop matrices and ecommerce-specific BI to present data that can aid in decision making. Some of the helpful information includes:

- Top performers

- Trending products analysis

- Marketing, sales and inventory reports

- Margin and trend analysis

- Decision Making

The key purpose of BI is to help enterprises in the process of decision making. As per studies, decisions based on evaluation of data provide a greater success rate (79%) as compared to decision made on intuitions. Business intelligence services effectively evaluate data and provide reports that enterprises can use for research purpose before developing strategies and models. For instance, BI can provide data related to past and present pricings of competitors which aids in the development of a better pricing model.

- Sales

BI enables enterprises to aid product sales by providing information about product demand and trending products. Ecommerce ventures can utilize this data in formulation of sales strategies. It also evaluates new profitable business opportunities and makes the company's platform efficient enough to handle large traffic during sale and festive season.

- Customer Retention

It is important for ecommerce websites to retain their customers as developing new customers is six to seven times more costly than retaining existing ones. BI provides insights of potential reasons that can reveal what compelled consumers to leave. It can collect information related to late shipments, returns, customer reviews and complaints, and analyze them to improve customer satisfaction and retention.

Competition in market is thriving the need of business intelligence for ecommerce ventures. It not only helps enterprises in improving the decision making process, but also allows them to monitor business outcomes on a regular basis.

Business intelligence involves gathering and processing large amounts of complex data for the purpose of supporting strategic business decisions. It provides structured, data-driven answers to questions like "What happened?" and can help e-commerce companies make more strategic decisions about future growth. Business intelligence is not just for large e-commerce companies — even small and growing e-commerce businesses can use BI to better understand how marketing, sales, AP, and other data-generating departments are impacting growth.

Successful BI implementation requires looking for an easy-to-use tool, getting buy-in from stakeholders, and ensuring staff has adequate training. Ecommerce companies that want to stay competitive in the coming years should look to implement BI today.

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