Data Visualization In E-Commerce An Indispensable Implementation In Real World Business Scenario

Harsh Goel, T. Venkat Narayana Rao

Abstract: In this era of digitalization, E-commerce has emerged and has changed the way of doing business. It is the process of running business using online platforms. Data Visualization plays a very key role in E-commerce. It has plenty of uses and it is found to be very useful. This paper focus on importance of having Data Visualization in E-commerce and how it can be useful to both owners and customers.

Keywords: E-commerce, M-commerce, Data visualization ,Business Data.

I. ELECTRONIC COMMERCE
It is a method of doing business in digital ways like by mobile applications and Internet. It is a combo of online retail as well as digital transactions. It has redefined present market and in today’s digital world, it is new and efficient way of doing business[1][2].

A. Types of E-commerce
It consist of Online Auction, Online Net Banking, Ticketing services and Business to Business (B2B) transactions. With the success and rapid growth of ecomerce, M-commerce (Mobile Commerce) has emerged which is subset of e-commerce and it involves selling goods and products via mobile phones and tablets[3][5]

II. Data Visualization
It is practice of displaying information in visuals by charts, graphs, and maps. It helps users to understand and analyze trends and patterns in data. As a picture is worth thousands of words , Data Visualization plays a very important role[4].

A. Observe with your own eyes
Data Visualization helps grasp and analyze huge amount of data. It helps us to convert large an complicated information into graphs and tables which can be read and understood by all. Consider a scenario where a salesman is trying to sell clothes to customer. He /She can tell that this shirt was bought by x% people and this shirt by y% people or he can simply show a pie chart which represents how many people have bought the shirts. By doing so, it helps customers to take wise decisions and can help in increase in sales.

We can derive insightful conclusions and can also help make proper business decisions. Many businessmen uses data visualization tools to attract customers by giving information like This is our best-selling item and 2,000 users are already enjoying it. Buy one today! (Plus, it’s on sale from this Monday to Thursday of next week!) By giving such information it can help customer in his shopping and he/she can make better decisions.

Example I:
Consider the below table (Table-1) which shows e-commerce sales and total mobile sales in US from year 2010 to 2014.

Table-1:E-Commerce sales from 2010 to 2014

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Total US E-Commerce Sales (SM)</th>
<th>Mobile</th>
<th>Mobile Sales (SM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1 10</td>
<td>$36,842</td>
<td>0.6%</td>
<td>$211</td>
</tr>
<tr>
<td>Q1 11</td>
<td>$32,203</td>
<td>1.4%</td>
<td>$451</td>
</tr>
<tr>
<td>Q1 12</td>
<td>$39,809</td>
<td>1.8%</td>
<td>$757</td>
</tr>
<tr>
<td>Q1 13</td>
<td>$50,014</td>
<td>2.0%</td>
<td>$1,080</td>
</tr>
<tr>
<td>Q1 14</td>
<td>$43,841</td>
<td>2.5%</td>
<td>$1,384</td>
</tr>
<tr>
<td>Q2 10</td>
<td>$44,948</td>
<td>3.7%</td>
<td>$2,635</td>
</tr>
<tr>
<td>Q2 11</td>
<td>$63,489</td>
<td>4.0%</td>
<td>$4,817</td>
</tr>
<tr>
<td>Q2 12</td>
<td>$72,361</td>
<td>4.7%</td>
<td>$6,523</td>
</tr>
<tr>
<td>Q2 13</td>
<td>$85,216</td>
<td>5.4%</td>
<td>$8,572</td>
</tr>
<tr>
<td>Q2 14</td>
<td>$98,647</td>
<td>5.9%</td>
<td>$10,078</td>
</tr>
</tbody>
</table>

This table can be converted to bar chart and can be represented as below(Figure-1)

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We can also make changes by seeing the data of any specific quarter or so. Below graph (Figure-2) shows data of last 4 years where e-commerce sales grew by 100%.

III. TOOLS OF DATA VISUALIZATION
Most important aspect of Data Visualization in E-commerce is that how you present your data to customer. Add only that information which customers will find interesting and useful. Some of the data visualization tools are:

A. Google Charts
They are complimentary, easy and can be customized. We can make scatter plots (as shown in Figure 3), charts and also we can view it on desktop as well as on mobile phones.

B. ChartBlocks
Here the information can be brought from “anywhere” with the help of API's. Some say that information can be brought in few clicks but it is bound to be more composite than other applications which have automatic module or extension of particular data points. In Figure 4 we can see the Gender breakdown of Social Networking users in form of ChartBlocks.

C. Tableau
Users can observe and comprehend the data by using this tool. Visualizations can be done via drag and drop and it can be shared with click. It is simple to use and it can connect to any database. Figure 5 shows us Tableau representation.
V. Comparison of data visualization tools:
There are many data visualization tools available. Each tool is having its own advantage and disadvantage. The below table (Table 2) shows the comparison of some data visualization tools.

<table>
<thead>
<tr>
<th>Tool</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infogram</td>
<td>Simple to use, wide range of visualization options</td>
<td>Limited data integration options, lack of real-time updates.</td>
</tr>
<tr>
<td>Google Charts</td>
<td>Good for creating interactive charts, easy to integrate with web pages.</td>
<td>Requires knowledge of coding, limits on customization.</td>
</tr>
</tbody>
</table>

VI. Choosing the right chart
Different kinds of data call for different kinds of visual representation. Example, use pie-chart for comparing percentages, line-graph for analyzing trends, bar-graphs to show distribution and so on. To choose the right chart, first, consider what kind of graph or chart makes the most sense for the data you have. Just like a creative agency would, we should consider which kind of visualization technique will help users to interpret the data[8].

VII. ADVANTAGES
A. Better Understanding of Business Data: Human eyes can understand information more effortlessly through visuals and metaphors when compared to text and mathematical records. It helps customers to get insight about products which may best suit them. It also helps business owners to see links involving multi-dimensional data set and give visualization tools suggestions to understand information with help of heat maps, fever chart and other graphical representations.

B. Easy Access to Data:
With the help of visualization, organization can find data whenever the situation demands and can do it more accurately than other companies. According to various reports, business organizations which use visual data tool are more liable to get suitable data than who depend on reports and dashboard. Users are able to discover information themselves without depending on anyone else.

C. Quick detection of recent Trends:
With the amount of data collected, companies can gather information about trends in the market, customer preferences and they can have an overview of market trends with revenues and business opportunities. They can access change in market trends more quickly and precisely.
D. More precise understanding of customers: Organizations can obtain in-depth information regarding customer behavior and their preferences, which gives them opportunity to launch services to their customers. These insights help organization to act on new business opportunities and help them stay ahead with their other competitors.

VIII. DISADVANTAGES
A. Data visualization tools do not give explanations:
Though visualized data can be generated in real-time, they do not give any explanation. Generally analysts consider data and then make reports. This process might be time-consuming and can be expensive[10].

B. Different users draw different insight:
Different users with same data visualization may not come out with same conclusion, it may depend on their earlier experiences and their level of expertise. This poses several problems for companies. Incorrect conclusions may put companies at risk[9].

C. Data visualization alone is not enough:
Though graphics are best for conveying simple ideas quickly but sometimes, they are just not enough. Only presenting information with picture is not correct, also presenting information with sentences and phrases will not be sufficient, we need mixture of both text and data then only information can be expressed clearly.

IX. CONCLUSION
This paper exhibits the importance of having Data Visualization in E-commerce. It has explained tools of data visualization, its uses and its advantages and disadvantages. Each tool of Data Visualization has its own merits and demerits. Thus Data visualization play a very important role in E-commerce and if it is implemented in a correct manner then it can help business in generating more revenues and can expand the business. There’s no denying the fact that data visualization is a wise investment for the future in e-commerce. Data visualization has changed the way we work with data by promoting an imaginative and creative approach. making organizations staying ahead of their game. In future companies will be able to make smart decision on business upon study and models. Visualization techniques will help companies to discover data points and will help them to raise questions. The implementation of data visualization in e-commerce will be epidemic such that no business or industry would tackle data based upon historical trends and patterns. It will become essential to deploy new tools to innovate, resolve problems and develop businesses.

REFERENCES: