AI in Marketing

Prof. Zillur Rahman

Department of Management Studies

Indian Institute of Technology, Roorkee

Week 3

Lecture-15 Marketing Information Systems and its Components

Welcome to this NPTEL online certification course on artificial intelligence in marketing. And now we are taking about module 15. Now as you can see that now we are discussing chapter 3 that is AI for marketing research. The first component of this chapter is to understand the marketing information systems and its component which we will talk about in this module 15. So, what are the things that will be covered in this module? So, we will start with understanding what is marketing information system and its components. Then we will understand the overarching role of different types of AI in collecting information and conducting marketing research. And thereafter, we will understand how AI can help develop process for company's internal records and developing marketing intelligence.

How AI can help conducting a more customized research on specific marketing programs than the traditional approaches. And then we will understand the algorithm market research. To start with collecting information and conducting marketing research. Making marketing decisions in a fast changing world is both an art and a science.

To provide context, insight and inspiration for marketing decision making, companies must possess comprehensive up to date information about macro trends as well as micro effects particular to their businesses. So, what is happening in the external environment and the internal environment? A marketing information system consists of 1 people, 2 equipment and 3 procedures. For what? To gather, sort, analyze, evaluate and distribute needed timely and accurate information to marketing decision makers. So, it consists of people, equipment and procedures to gather, sort, analyze, evaluate and distribute needed timely and accurate information to the marketing decision makers. What are the components of the MIS? That is marketing information system.

MIS relies on internal company records, marketing intelligence activities and marketing research. So, these are the 3 components of marketing information system. Internal records, marketing intelligence and 3 is marketing research. Now, let us look at each one

of them to understand what does those names means. An internal record system includes information on the order to payment cycle and sales information system.

A marketing intelligence system is a set of procedures and sources used by managers to obtain everyday information about pertinent developments in the marketing environment. So, it is about the pertinent development related to us. A marketing research system allows for the systematic design, collection, analysis and reporting of data and findings relevant to a specific marketing situation. So, that is a systematic design, collection, analysis and reporting of data and findings. The next thing that we will talk about in this module is the overarching role or different types of AI.

So, the different intelligent designs of AI are, as we have seen earlier, mechanical AI that is used for automating repetitive tasks, thinking AI to process data to arrive at new conclusions and decisions and feeling AI to analyse human feelings and emotions. So, these are the 3 archtypes of artificial intelligence and they are supposed to do 3 different types of activities. So, what does mechanical AI do? It can automate data collection about the market, the environment of the firm, the competitors and the customers. So, that is, it keeps on collecting automatically all the time. For internal records and developing marketing intelligence, automation technologies can do back-office activities from transferring data into records to extracting information from multiple databases.

It can also use algorithms to direct patterns hidden in the vast set of internal data. So, with the, with the passage of time, more and more data keeps on coming. And it becomes difficult for, for a human to understand the patterns within that data. So, this mechanical AI can be used for that kind of purpose. It can also facilitate data sensing, tracking and collection from external sources.

How it can do it for market research? Customer intelligence including data about consumers, their activities and their environments can be collected using connected devices. It can capture unstructured marketing activity data. The next is thinking AI. So, thinking AI can be used to predict and derive new insights about the market, the environment, the competitor and the customers. Now, how it can be used for internal records and marketing intelligence? Predictive analytics can be used to predict volatile market trends.

Thinking AI can help to identify competitors in a well-defined market or outside options in a new market and to derive insights for the product's competitive advantages. Big data marketing analytics is now a mainstream approach for generating marketing insights. So that is big data marketing analytics is being used to generate marketing insights. For market research, predictive analytics are commonly used to predict heterogeneous

consumer preferences. So, we are not talking of homogeneous but heterogeneous.

Automated text analysis can be applied for consumer research, for marketing insights and for analyzing consumer consideration heuristics. Prediction interfaces also use individuals and contextual information. The third type of AI is the feeling AI. Feeling AI can facilitate customers understanding over and above mere market analysis. So, those two types of AI was used for market analysis.

Now, we come to feeling AI which is for understanding the customers. So that involves emotional data about the customer sentiments, feeling, preferences and attitudes. So that is what is more important with this kind of AI that it can look into customer sentiments, feelings, preferences and attitudes. For internal records and marketing intelligence, it can analyze and account for emotional data. Sentiments expressed by consumers in the social media that is online reviews and tweets including explicit and implicit language and discourse patterns can be analyzed to understand consumer responses using their own language.

So, consumers across the world keep on giving online reviews and tweets and using explicit and implicit languages. So, this feeling AI can be used to decipher the consumer sentiments and what do they want to say. For market research, feeling AI can be used to understand existing and potential customer needs and wants. For example, who they are, what they want and what their current solutions are. Product usage and consumption experience can be visualized with Internet of Things, augmented reality and virtual reality.

The next comes the internal record. So, let us understand what are internal records. Internal records refers to data that a company generates, one, collects, two and controls on its own. So, that is the internal record. Any information pulled from internal databases, softwares, customers and reports would be considered as internal data.

Data is no longer merely an asset. It is the lifeblood of the modern digital economy. So, that is now it is the lifeblood. So, it is not just an asset but the lifeblood. Companies with superior information can choose their markets better, develop better offerings and execute better marketing planning.

Every firm must organize and distribute a continuous flow of information to its marketing managers. Now, what are the sources of internal records? One is internal documents and archives, business systems and application data, customer data and Internet of Things sensor data. So, all these are the internal records that a company has with it. Companies can accomplish a lot just using internal data. For decades,

organizations have relied on internal data to power continuous improvement methodologies such as Lean Six Sigma.

So, this data is very powerful and it can be used for, for a variety of purposes. Companies are not taking things one step further by the help of AI to not only using internal data to optimize processes but also to derive innovation as well. The story of Zappos. Zappos tapped into its vast customer data to build a ML powered predictive model that accurately predicts shoe size. Since its inception, this new feature has dramatically decreased returns due to sizing issues.

So, this is another cost saving because customers they keep on buying and then returning the shoes because of sizing issues. But with this predictive model, this return has come down. Artificial intelligence and internal records. When organizations can organize, make sense of and leverage their data, they can make more accurate predictions, forecasts and plans for all areas of their operations.

Analyzing the records. Rather than having to constantly run reports manually, AI can assist in running periodic reports. Identifying and forecasting the trends. Machine learning tools can analyze large datasets to identify patterns and make predictions. So, large datasets are now being used.

Optimal points. Algorithms can be used to calculate optimal maintenance schedules in a factory. Furthermore, using data science tools, businesses can determine what elements they need to focus on to reach their most important targets and can then implement the most effective plans to reach them. Opportunity identifications. Another capability of data science tools and analytics is opportunity identification. Using historical and forecasted market data, businesses can identify geographic areas to target to penetrate for sales and market initiatives with greater accuracy.

So, this is important here, the greater accuracy. Now the question is, is information from internal records enough? Internal data and analytics does not always tell the same story. What leading edge companies are beginning to realize is that in order to unlock the power of predictive and prescriptive analytics, they are going to need to start incorporating marketing environment, external data sources into their analytics framework as well. So, with the growing external data, it is now time to integrate the internal data and external data. The next question is, what is marketing intelligence? A marketing intelligence system is a set of procedures and sources that managers use to obtain everyday information about developments in the marketing environment.

So, this is what, this is a set of procedures and sources. So, managers keeps on using

everyday so that they can be in tune with the changing marketing environment, in tune with the changing marketing environment. The internal record system supplies results data, but marketing intelligence system supplies happening data. So, this is current data and this is past data. Marketing managers can collect marketing intelligence in a variety of different ways.

Furthermore, these other sources of information are also known as external data. So, examples of some traditional sources of marketing intelligence are, 1, the government sources, 2, intermediaries, 3, you hire external experts and 4 is the customer data. What is external data? External data is data that is generated, collected and stored outside of the business. So, it is generated, collected and stored outside of the business.

It may be often unstructured. It can include anything from public, government issued information to user generated social media content. So, it can be public generated, government issued information or user generated social media content. With, while internal data helps organization run their business and optimize operations. So, this is what internal data does. External data is often used to build more complex predictive models and gain deeper insight into customer behavior and the competitive landscape.

So, internal data is more to put your house in order while the external data is to gain deeper insight into the customer behavior and the competitive landscape. Next we will understand AI and marketing intelligence. Different forms of AI can help marketers seeking information about the consumers and the competition. How? First is through mechanical AI. Private and public information can be analyzed in order to develop a better understanding of the defined element from an individual person to entire communities.

So, it is good not only for individual person, but whole of the communities. Social media can be reviewed for preferred shopping preferences and media consumption. Mechanical AI can automate data collection about the market, the environment, the firm, the competitors and the customers. In the digitally connected world, market data can be easily tracked and monitored using mechanical AI tools as data sensing, tracking and collections. Now, let us look at where does data comes from.

So, this is the mobile audience reach of leading micro, smartphone apps in the United States in January 2022. So, YouTube accounted for 73% of the data, Facebook 63%, Gmail 57%, Google Maps 56%, Google search 54%, and Amazon mobile 51%, and Facebook messenger 47% data. Weather channel that is 44%, Google Play 40%, Instagram again 40%, Google Photos 32%. So this is on the x axis we have the share of mobile audience reached. So, now you see that it is about 73% that the mobile audience

has reached.

And here on this axis we have the various various companies the data from where it is coming. You can see that 73% of the audience is there on the YouTube while 63% on the Facebook etc. Through thinking AI, thinking AI can be used to identify competitors also in a well-defined market or outside options in a new market and to derive insights from a product's competitive advantage. Supervised machine learning can be used for a mature market where the market structure is stable. So, supervised machine learning can be used in these kind of markets where the market structure is stable and known to marketers.

Whereas unsupervised machine learning can be used in new markets or sporting outside options where the market structure and trends are unstable and unknown to marketers. So when you are looking at mature markets then you look at supervised machine learning and when you are looking at the growing market, unstructured market then you look for unsupervised machine learning. Predictive analytics can also be used to predict volatile market trends and customers heterogeneous preferences. Prediction interface also use individual and contextual information. They often refer to information related to other users either explicitly by mentioning others when framing recommendations.

Now let us look at the story of Spotify. Spotify use natural language processing to rapidly and continuously scrap the internet for articles, blogs and metadata to identify what new artists and songs are trending. So they set continuously keep on doing. It then uses this information to build playlist and provide users with personalized music recommendations. Spotify also use natural language processing and convolutional neural networks to listen to music and based on what it hears automatically categorize generally and group together similar titles. So now you see that this is what in addition to to looking at the new artist and songs it also categorize them together with other similar titles.

Now let us look at the story of Delta how AI changed data. In January 2020, Delta announced they were creating a full scale AI enabled digital simulation environment for its global operation. The new data science ecosystem combined internal data that is flight schedules, aircraft positions, customer service data and external data that is the weather data, airport condition, geopolitical events to help data professionals make critical decisions before, during and after large scale disruptions. Now let us look at the challenges with AI and external data.

One is the reliability of the source. Second is they are prohibitively expensive. The third are the legal implications to consider. For example, certain external data may be

subject to different privacy laws than the internal data. So internal data that you already have may not be liable for this legal implications. But external data certainly have those kind of connotations.

Whatever parameters are put into an AI system will determine the information that comes out of it. Too often this can result in overlooking marginalized cultures, underprivileged communities and minority populations. So, this is the biases that can be there in this system. Now let us look we are talking about algorithm market research man versus machine. Artificial intelligence is also increasingly gaining ground in the field of market research.

Some say it is the death of traditional market research. Other experts argue that it is a chance to focus on what is essential and achieve real depth of research results. One thing is certain, if machines are to be placed a human, if they are to be applied meaningfully in productions, hospitals and household, they also have to learn and act through observation and experience. So this is what the challenge with currently with the machines is that they need to learn through observation and experience also. So that they can be meaningfully employed in productions, hospitals and households. In market research, computer aided programs can analyze the entire data material faster and more thoroughly so that the human on the other side of the computer can concentrate on the important detailed questions.

Algorithms and AI thus entail a degree of market research liberalization. Programmatic market research allows for data driven automated market research in the B2B sector. With this companies cannot only analyze their own data. So it is not about analyzing their own data but also the market data, data of other companies, industry data and much more and use the results of this analysis. In practice, these are methods with which a computer makes decision of which some input information is summarized to form an overall decision.

So these methods, they can be used to help in overall decision making. Furthermore, AI systems are capable of learning and based on the results of previous decision are able to adopt to their decision logic. So experience is what you would call it in human. So now this AI systems are also gaining experience capabilities.

Learning by experience. It is the business of market research to capture and comprehend consumers motivation. The insight gained this way give marketing the opportunity to tailor services and products to customers even better. So this market research will unearth the consumer motivation and the insights can be given is an opportunity to tailor the product and services for customers to better meet the customer's

needs and motivations. The foundation of the whole trade is the idea of a subject acting autonomously and making decisions which can be justified and influenced.

The more data is available for this purpose, the better it is. More is better. Meanwhile learning artificial systems are an indispensable aid to analyze huge data volumes and help with the decisions. So this is learning artificial systems. They are even more useful to analyze huge data volumes and helps in the decision making.

Nevertheless, human intelligence is superior in certain areas. Especially when the topic is not limited to a particular field. As is the case with gaming computer where program data is quasi only retrieved. Computers that can deal with the unforeseen that has not been programmed for instance If the data collection method of a variable has changed and the system recognizes this independently and looks for solution will come close to human intelligence. So this will be the kind of AI that will come closer to human intelligence. This kind of intelligence however is based on holistic knowledge about the world and will and will remain reserved for human for some times to come.

So this is what is lacking in AI systems and it is the exclusive domain of human. This holistic knowledge. So for some time to come this will remain the domain of human as compared to artificial intelligence. Liberalization of market research. Typically 80% of the time in market research is spent on time consuming tasks such as sampling, data acquisition and analysis leaving only 20% for decisive detailed questions.

By means of innovative big data and AI processes this process can be automated. So this 80% of the time can be saved. So that market researchers have more time for really value adding activities such as the interpretation of the analysis results and to derive recommendations and actions. In future market research will be oriented less towards samples and interviews but rather pursue a real time census approach with automated analysis.

So now all this sampling etc is gone. So now we will talk about the census approach and automatic analysis rather than inputting that into the system and then conducting an analysis etc. By its very nature market research is an extremely data driven industry. So that is extremely data driven. Market researchers have always collected, edited and analyzed data and dealt with it with the interpretation of this data.

In today's fast paced world we are facing an enormous volume of data. We have already been jungling with zeta or even yota bytes for quite some time. The global data volume is doubling every two years resulting in task nine cannot cope with alone. Technology not only provides memory space and the adequate computing power to be able to deal

with the mass of data but also diverse evaluations and analysis possibilities. The latest development in the area of machine learning allow making smart data from big data and using data economically. Successful market research must adopt accordingly and integrate these innovations in its work if it does not want to be left behind.

For example, there is already software which automatically converts the answer of the subject from studies into codes while not only considering the respective main statements but also extracting and semantically linking all the other information. The significance is increased by a multiple thereof. Far reaching interpretations then follows thereby the code plans reach a new level of detail difficult to achieve with manual processes. AI systems are an intelligence amplifier. Poorly drawn up, poorly maintained and poorly interpreted they only produce cost, trouble and nonsense.

Well programmed, capable of learning and used intelligently artificial intelligence can save a lot of work and create time for depth of detail. When it comes to decision logic, for example, artificial systems are always more complex and by far more precise and that is exactly why predictive analytics that is the prediction of customer losses of sales figures or price acceptance is so useful. So, to conclude in this module we have defined what is marketing information system and its components. Further we have understood the overarching role of different types of AI in collecting information and conducting marketing research. We have learned how AI can help develop processes for company's internal records and developing marketing intelligence.

We have discussed how AI can help conducting a more customized research on specific marketing programs than traditional approaches. And lastly we have discussed algorithmic market research. And these are the four books from which the material for this module was taken. Thank you.