The lecture of Session 3 explains omnichannel dynamics and the application of VAR model. Nowadays, customer journey is becoming much more complex. For example, if a customer wants to buy a digital camera, the customer will investigate a brand at a manufacturer's website or visit a retailer to evaluate the product in person. Eventually, the customer might want to go back to the physical store retailer and buy the product in store. Omnichannel dynamics is about to create a model for such complex journey about how customers interact with firms at multiple touch points. There are many effects behind the direct effects that how mobile ads and paid search ads affect the sales. For example, cross media effects are how paid search ads and mobile ads affect each other, carryover effects is how past mobile ads or past paid search ads affect current mobiles ads or paid search ads, performance feedback effect is how past sales affect current paid search ads and mobile ads, and Purchase reinforcement effects is how past sales affect current sales. While there are many complex effects, VAR model is designed to model these complex loops, as it could analyze the cross effects and dual causality. In practice, VAR model could be applied to analyze both the short- term and long-term effects of marketing programs or optimizing marketing budget allocation using long-term elasticities. VAR model usually has endogenous and exogenous variables. When a variable appears on both sides of the model, it is an endogenous variable. When a variable appears on only one side of the model, then it is an exogenous variable. The strategy of differing endogenous variables from exogenous variables is analyzing the Granger causality. An independent variable is said to Granger-cause a dependent variable if the dependent variable can be better predicted using the histories of both the independent variable and dependent variable than predicting using the history of dependent variable alone. There are multiple steps doing the VAR modeling. First, we need to check the stationarity of the performance variable by identifying that whether there is long-run component of growth in the dataset. If the dataset is not stationary then, we need to do cointegration test to find out that whether a long-run equilibrium exist between the evolving variables. Then, we could construct the VAR model estimation. The first step is to determine the optimal lag length by looking at the acf and pacf plot or using built function in R/Package. Then, we could estimate the model using OLS and minimizing the error. When we should check if the means of residuals for the model are close to zero. Finally, we could drop the variable with the smallest t-statistic and re-estimate the model, until the performance of the model could not improve anymore. After we have the optimal model, we could implement the Impulse-Response Function, which helps to determine that whether one marketing variable has an impact on the sales, and, if so, the effectiveness of a marketing variable. There are three types of IRFs: classical IRFs, orthogonalized IRFs, and generalized IRFs. With the help of IRFs of the log-log model, we could determine the log-term elasticities of media consumption and sales and design the optimal media allocation that could maximize the efficiency of marketing strategy.