*International Journal of Engineering Applied Sciences and Technology, 2020*
**Vol. 4, Issue 9, ISSN No. 2455-2143, Pages 404-408**
Published Online January 2020 in IJEAST (http://www.ijeast.com)


# INFLUENCING FACTORS OF BUSINESS INTELLIGENCE CONTINUANCE USAGE INTENTION: A CASE STUDY OF GOVERNMENT-OWNED INSURANCE COMPANY

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***Abstract*— Business Intelligence is a technological trend in supporting strategic analysis and decision making in organizations. Many organizations claimed to have successfully adopted Business Intelligence, many also reported failure after adoption. Taspen is one of government-owned insurance company in Indonesia that has problems with the use of Business Intelligence, it decreased to reach 16% in the first year. Based on these facts it is necessary to analyze the factors that influence the continued use of Business Intelligence in the company. This study uses a quantitative approach through the distribution of questionnaires to decision makers and users of Business Intelligence. From the results of data collection, there were 195 respondents who were analyzed using Covariance Based SEM (CB-SEM) with the help of IBM Amos v22 software. This study proposes a framework model that combines External Stimuli, Affective Response, and Cognitive Response to the continuity of Business Intelligence use. The results of this study indicate that Information Integration and productivity increase are the most significant factors influencing the continuity of Business Intelligence use. Factors such as influence organizations and influence peers still need to be investigated further to identify the causes of the weak influence on the continued use of Business Intelligence.**

*Keywords*— ***Business Intelligence, CB-SEM, Continuance Usage Intention, Taspen***

## I. INTRODUCTION

The growth of the current business environment requires organizations to provide a fast and comprehensive information flow. The ability to adapt to technological developments and manipulate large information is an important factor for improving decision-making processes and competing against competitors (Hannula and Virpi, 2003). There is a trend that organizations invest large costs in Business Intelligence to improve decision making capabilities. Based on Gartner's information technology investment survey, Business Intelligence technology is in the top priority of Chief Information Officers (CIO). When IT investment only increased by 0.4%, investment in Business Intelligence technology increased by 7.9%.

Although the development and investment of Business Intelligence is growing rapidly, many organizations have complained of Business Intelligence that is not in accordance with the expected results. A survey conducted by 200 decision makers showed that the majority of organizations have spent billions of Rupiah on Business Intelligence, but 62% of respondents stated that users did not get the expected results. According to Orlikowski and Iacono (2001), there is no single conceptual snapshot of IT that will capture all usage contexts. Unlike other operational systems, Business Intelligence is a challenge in itself because it is a large enterprise system, long-term maintenance, and difficult to assess. (Seddon et al, 2010).

To understand user behavior, it is very important to consider the continued use of an information system when the user has been using information system for a long time in daily activities (Bhattacherjee, 2001). Realizing the need to better understand continued IS usage behavior, researchers have recently begun to study the subject in more detail (Karahanna et al, 1999; Bhattacherjee 2001; Venkatesh 2002). The focus of research on IT adoption and post-adoption or IS continuance has been on mainly cognition-oriented behavior models, such as the technology acceptance model (TAM) (Davis, 1989), the Theory of Planned Behavior (Ajzen, 2001), and the IS continuance model (Bhattacherjee, 2001).

Taspen is a company engaged in the field of insurance for civil servants. Taspen has Business Intelligence as one of the Business Management Programs in the Information Technology Master Plan (ITMP). Based on data from Business Intelligence managers, it is known that the use of Business Intelligence does not reach the target. Until the end

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of 2019, active users of Business Intelligence do not exceed 16%. The gap between reality and expectations raises the problem of the successful use of Business Intelligence. According to Rasanen (2001), business success is dependent upon three factors. A company must be able (1) to satisfy its core business agenda and, secondly (2) to form product entity that is successful among the customers. The third is (3) the external business environment. Management needs to predict any changes and make decisions based upon flawless real-time information. This is so because, given its critical role in today's business processes, infrequent, inappropriate, and ineffective long-term use of IS often contributes to corporate failures (Lyytinen and Hirschheim, 1987). Continuance is not entirely an alien concept in IS research. It has been examined variously as "implementation" (Zmud 1982), "incorporation" (Kwon and Zmud 1987), and "routinization" (Cooper and Zmud 1990) in the IS implementation literatur.

Based on this, it is necessary to analyze the factors that influence the continued use of Business Intelligence in the company. This study proposes a model to identify External, Internal, Affective and Cognitive factors, which consists of motivational factors, success factors, beneficial factors, and organizational factors towards the survival of Business Intelligence. These problems will be analyzed further in the research.

## II. DESIGN OVERVIEW

The method used in this research is a case study. The study was conducted using a quantitative approach through the distribution of questionnaires to Business Intelligence users. The questionnaire statement was divided into two parts, the first was related to respondent demographics, and the second was related to research statements. The first part contains the demographics of respondents consisting of gender, age, education, position, work unit, experience and frequency using Business Intelligence, the next section is a statement that represents the variables in the research model. The statement uses a likert scale with an interval of 1 to 6.

Table 1. Research design

| Element | Information |
|---|---|
| Classification | Case Study |
| Paradigm | Evaluative |
| Research purposes | To identify the factors that influence the use of Business Intelligence |
| Data Type | Likert scale with interval 1 to 6. |
| Data Collection | *Online* and *offline* questionnaire |
| Data Analysis | Quantitative |
| Method of Conclusions | Deductive |
| Data Processing Method | SEM (*Structural Equation Modeling*) |
| Research Instrument | 6 independent variables and 6 dependent variables |
| Data Source Population | 195 respondent (*error level* 5%) |
| Data processing tools | Microsoft Excel, SPSS, dan Amos |

This study uses non-probability sampling where research subjects are not taken randomly but rather determined by the authors. The author uses a purposive sampling method where users have used Business Intelligence for a certain period. Data collection is carried out for approximately one month through online and offline media. The population of Business Intelligence users is 250 users, consisting of the board of directors, General Manager, Head of Work Unit, Manager, Assistant Manager, functional employees, and staff. From the results of data collection, 195 respondents were obtained with an error level of 5%, then an analysis was performed using Covariance Based SEM (CB-SEM) with the help of the IBM Amos v22 application. Data analysis with SEM aims to determine the level of validity of the construct and to determine the level of reliability of the indicators used, as well as the level of significance of the relationships between constructs.

## III. EXPERIMENT AND RESULT

Based on the data, it can be seen that respondents are dominated by men with a percentage of 70.3%, respondents aged between 21-29 years with a percentage of 47%, for more details see Table 2.

Table 2. Respondent demography

| Variable | Category | Percent |
|---|---|---|
| Sex | Man | 70,3% |
| | Woman | 29,7% |
| Age | 21-29 years old | 47% |
| | > 50 years old | 30% |
| | 30-39 years old | 13% |
| | 40-49 years old | 9% |
| Education | Master | 14,9% |
| | Bachelor | 61,5% |
| | Diploma | 19% |
| | High School | 4,6% |
| Position | Staff | 49,74% |
| | Functional Staff | 22,56% |
| | Assistant Manager | 5,64% |
| | Manager | 15,38% |
| | General Manager | 6,15% |
| | Board of Director | 0,51% |
| Experience of Using Business Intelligence | Less than 1 year | 61,5% |
| | 1-2 years | 24,6% |

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| | | |
|---|---|---|
| | > 2 years | 13,8% |
| Frequency of Using Business Intelligence | More than 1 month | 34,4% |
| | At least once a month | 28,7% |
| | At least once a week | 17,4% |
| | Almost Everyday | 13,5% |

The author conducts the measurement model test and the structural model test. The measurement model test aims to find out how precisely the indicator explains its latent construct, while the structural model test determines whether a hypothesis is rejected or accepted. The measurement model test consists of the validity test, the reliability test, the goodness of fit test, while the structural model test consists of the hypothesis test and the significance of the relationship between constructs. Validity test is divided into convergent validity test to see the loading factor value of each indicator, and to see the average variance extracted (AVE) value. The discriminant validity test compares the loading indicator value with cross loading, and compares the AVE square root value of a construct with the value of correlation between constructs. Reliability test is performed to see the value of construct reliability (CR) and cronbach's alpha (CA) of each construct. The CR and CA values for each construct must be ≥ 0.7.

Table 3. Measurement model test

| Indicator | Estimate | AVE | CA | CR |
|---|---|---|---|---|
| II3 | 0.897 | 0.700777 | 0.874936 | 0.895 |
| II2 | 0.845 | | | |
| II1 | 0.764 | | | |
| IP1 | 0.911 | 0.801495 | 0.941661 | 0.957 |
| IP2 | 0.913 | | | |
| IP3 | 0.897 | | | |
| IP4 | 0.859 | | | |
| AR3 | 0.908 | 0.709707 | 0.879653 | 0.905 |
| AR2 | 0.791 | | | |
| AR1 | 0.824 | | | |
| C1 | 0.924 | 0.778392 | 0.913218 | 0.913 |
| C2 | 0.845 | | | |
| C3 | 0.876 | | | |
| TR3 | 0.698 | 0.65621 | 0.885429 | 0.896 |
| TR2 | 0.89 | | | |
| TR1 | 0.944 | | | |
| IQ3 | 0.768 | 0.65621 | 0.850995 | 0.86 |
| IQ2 | 0.866 | | | |
| IQ1 | 0.793 | | | |
| CU3 | 0.923 | 0.688705 | 0.867898 | 0.89 |
| CU2 | 0.719 | | | |
| CU1 | 0.835 | | | |
| USE1 | 0.819 | 0.749979 | 0.899849 | 0.923 |
| USE2 | 0.876 | | | |
| USE3 | 0.901 | | | |
| RE3 | 0.852 | 0.794851 | 0.920639 | 0.919 |
| RE2 | 0.945 | | | |
| RE1 | 0.875 | | | |
| S3 | 0.914 | 0.66068 | 0.851082 | 0.847 |
| S2 | 0.86 | | | |
| S1 | 0.638 | | | |
| IFP3 | 0.932 | 0.823708 | 0.933375 | 0.933 |
| IFP2 | 0.88 | | | |
| IFP1 | 0.91 | | | |
| IO3 | 0.854 | 0.655807 | 0.883164 | 0.879 |
| IO2 | 0.885 | | | |
| IO1 | 0.693 | | | |
| IO4 | 0.794 | | | |

The validity test on the measurement model test shows that the comparison of loading indicator values is greater than cross loading, the comparison of AVE squared values is greater than the correlation between constructs. These results indicate that all indicators and variables in the test measurement model are valid and reliable.

Structural model test consists of hypothesis test and relationship between constructs test. The hypothesis is accepted if the p-value < α (0.05) and | C.R. | > 1.96. For relationship between constructs test, if the estimated value > 0.5, then both constructs have a strong relationship, whereas if the estimate value <0.5 then the two constructs have a weak relationship.

Table 4. Goodness of fit test results

| Criteria | Cut off value | GOF Score | Result |
|---|---|---|---|
| **CMIN/DF** | ≤ 2 atau ≤ 3 | 1.315 | Good fit |
| **GFI** | > 0,8 | 0.842 | Good fit |
| **RMR** | As low as possible | 0.042 | Good fit |
| **RMSEA** | ≤ 0,05 | 0.043 | Good fit |
| **TLI** | ≥ 0,9 | 0.967 | Good fit |
| **NFI** | ≥ 0,9 | 0.906 | Good fit |
| **CFI** | ≥ 0,9 | 0.975 | Good fit |

Table 5. Structural Model Test Results

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| Variable | | | C.R. | P | Test Results | Estimate |
|---|---|---|---|---|---|---|
| InProductivity | ← | InfIntegration | 7.122 | *** | Accepted | 0.736 |
| AdReporting | ← | InfIntegration | 6.108 | *** | Accepted | 1.449 |
| Customization | ← | InfIntegration | 3.13 | 0 | Accepted | 0.424 |
| InProductivity | ← | InfQuality | 1.873 | 0.06 | Rejected | 0.23 |
| AdReporting | ← | InfQuality | -2.224 | 0.03 | Accepted | -0.62 |
| Customization | ← | InfQuality | 2.411 | 0.02 | Accepted | 0.419 |
| Trust | ← | InProductivity | 3.318 | *** | Accepted | 0.254 |
| Satisfaction | ← | InProductivity | 6.327 | *** | Accepted | 0.863 |
| Trust | ← | AdReporting | -2.923 | 0 | Accepted | 0.714 |
| Satisfaction | ← | AdReporting | 7.235 | *** | Accepted | -0.111 |
| Trust | ← | Customization | -0.953 | 0.34 | Rejected | -0.26 |
| Satisfaction | ← | Customization | 0.384 | 0.7 | Rejected | 0.034 |
| BIConUse | ← | Trust | 0.352 | 0.73 | Rejected | 0.241 |
| BIConUse | ← | Satisfaction | 2.06 | 0.04 | Accepted | 0.03 |
| BIConUse | ← | InfPeers | 0.382 | 0.7 | Rejected | 0.037 |
| BIConUse | ← | InfOrganizations | 1.457 | 0.15 | Rejected | 0.132 |
| BIConUse | ← | Competence | 0.404 | 0.69 | Rejected | 0.031 |
| BIConUse | ← | Relatedness | 3.834 | *** | Accepted | 0.371 |

The results of the structural test show that not all hypotheses put forward by the author are accepted, there are seven hypotheses rejected. However, indicators and variables in the structural model test are valid and reliable. Based on the results of the model test, a concept of model that affects the continued use of Business Intelligence is formed.

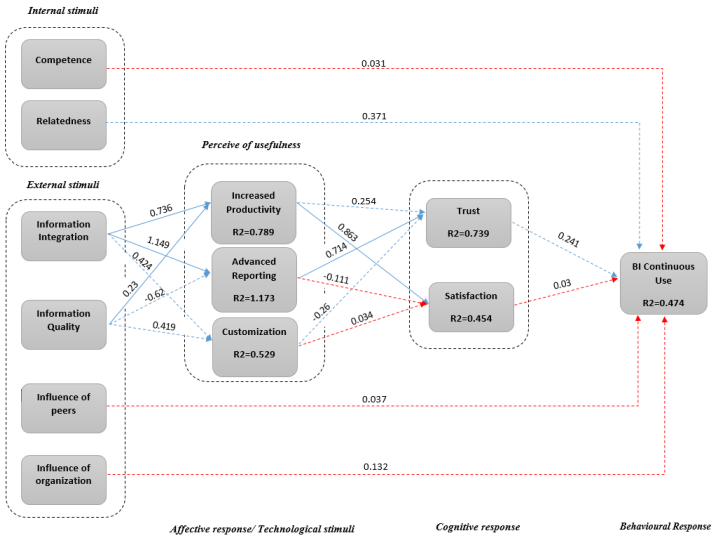


Fig 1. Research model

## IV. CONCLUSION

Based on research findings, it can be concluded that:

1. The most significant factor from the external side that affects the continued use of Business Intelligence is information Integration with a value of | C.R | = 7.122 and p-value = ***. This shows that users will continue to use Business Intelligence because it is able to integrate information from various sources to increase user productivity.
2. The most significant factor in influencing the continued use of Business Intelligence in terms of the perceive of usefulness is increase productivity with a value of | C.R | = 7,235 and p-value = ***. Users will continue to use BI because it can improve performance productivity, assist in better decision making, analyze complex problems and produce reports quickly.
3. In terms of internal stimuli, although not significant, the relatedness factor has an influence on the continuance use of Business Intelligence, with a value of | C.R | = 3,834 and p-value = ***. This indicates that users feel valued by the organization, and feel accepted by the environment, thus influencing their desire to continue to use Business Intelligence.
4. Although not significant, the trust factor is a cognitive response that has an influence on the continued use of Business Intelligence, with a value of | C.R | = 2.06 and p-value = 0.04. The influence of trust has not significantly affected the continued use of Business Intelligence. There are still issues of trust in the validity of data that have implications for decision making using Business Intelligence.
5. Organizational factors consisting of influence organizations and influence peers do not have an


influence on the continuance use of Business Intelligence. The influence factor of organization has a value of | C.R | = 1,457 and p-value = 0.15, and the influence peers factor has a value of | C.R | = 0.382 and p-value = 0.7. This indicates that there is no management support in using Business Intelligence and the organization has not tried to increase interaction between Business Intelligence users.

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