

# opción



Revista de Antropología, Ciencias de la Comunicación y de la Información, Filosofía,  
Lingüística y Semántica, Problemas del Desarrollo, la Ciencia y la Tecnología

20

Año 35, 2019, Especial N°

Revista de Ciencias Humanas y Sociales

ISSN 1012-1537 / ISSNc: 2477-9385

Depósito Legal pp 198402ZU45



Universidad del Zulia

Facultad Experimental de Ciencias

Departamento de Ciencias Humanas

Maracaibo - Venezuela



# Auditors Brainstorming Effort in Detecting Fraud: Indonesian Government Case

**Yusnaini<sup>1</sup>**

University of Sriwijaya, Palembang, Indonesia

<sup>1</sup>yusnaini@fe.unsri.ac.id

**Rina Tjandrakirana<sup>2</sup>**

University of Sriwijaya, Palembang, Indonesia

<sup>2</sup>rinatjandrakirana@fe.unsri.ac.id

**Ermadiani<sup>3</sup>**

University of Sriwijaya, Palembang, Indonesia

<sup>3</sup>ermadiani@fe.unsri.ac.id

**Ahmad Subeki<sup>4</sup>**

University of Sriwijaya, Palembang, Indonesia

<sup>4</sup>rira16@unsri.ac.id

**Agil Novriansyah<sup>5</sup>**

University of Sriwijaya, Palembang, Indonesia

<sup>5</sup>agilnovriansa@unsri.ac.id

## Abstract

This study examines the effects of fraud type and accountability on internal auditor brainstorming effort for fraud detection. Data analysis conducted by the use of one-way ANOVA and independent sample t-test as a method. The results show that there are no significant differences brainstorming effort for internal auditors to detect fraud among either the three types of fraud or accountability pressure. In conclusion, pertaining to the role of accountability pressure, review of the auditor's performance is required in order for the internal auditors to have greater effort in detecting fraud.

**Keywords:** Brainstorming, fraud, type, accountability.

# *Esfuerzo de lluvia de ideas de los auditores para detectar fraudes: un caso del gobierno de Indonesia*

## **Resumen**

Este estudio examina los efectos del tipo de fraude y la responsabilidad en el esfuerzo de intercambio de ideas del auditor interno para la detección del fraude. Análisis de datos realizado mediante el uso de ANOVA de una vía y prueba t de muestra independiente como método. Los resultados muestran que no hay diferencias significativas en el esfuerzo de lluvia de ideas para que los auditores internos detecten el fraude entre los tres tipos de fraude o presión de responsabilidad. En conclusión, en relación con el papel de la presión de rendición de cuentas, se requiere una revisión del desempeño del auditor para que los auditores internos tengan un mayor esfuerzo para detectar el fraude.

**Palabras clave:** lluvia de ideas, fraude, tipo, rendición de cuentas.

## **1. INTRODUCTION**

The study aims to examine whether the differences among fraud (fraudulent financial reporting, misappropriation of assets and corruption) and accountability pressure (accountability and anonymity) leads to a difference in brainstorming efforts of government internal auditors in detecting fraud. Previous research has shown that the quality of fraud detection procedures is higher after brainstorming

sessions (Carpenter, 2007). Group brainstorming results have higher quality fraud detection procedure than individual brainstorming (Hoffman and Zimbelman, 2012). A test by Brazel et al. (2010) showed that high brainstorming qualities enhanced an association between risk factors and fraud risk assessment and it moderated their association with fraud-related tested.

The results of this study offered theoretical and practical insights on brainstorming on fraud and also showed that the benefits of brainstorming are not generally accepted (Brazel et al., 2010). Previous studies used external auditors as respondents to test the brainstorming effect on fraud detection. This study develops the results of Dezoort and Harrison (2008) studies which showed that the external auditor's perception of responsibility for detecting fraud is positive to the number of brainstorming procedures but not on different subjects and cases. This study uses government internal auditors as respondents with fraud cases in the public sector that brainstorming is performed on fraud detection procedures by government internal auditors.

In this study, accountability refers to the concept of accountability of social contingency model. The concept suggested that accountability pressures can stimulate politically motivated needs to sustain the positives of constituents important evaluations. In this case, when a government internal auditor (APIP) has no high responsibility for detecting fraud, their accountability will be questionable by public. Several studies have shown the role of accountability to affect the auditor's performance (Asare et al., 2000), affected the effects of dilution and audit evidence Glover (1997),

Hoffman & Patton (1997) and have influenced opinion and judgment audit.

Dezoort and Harrison (2008) study showed that accountability (ACC) and anonymous (ANN) influenced brainstorming effort in detecting fraud. The finding of this study shows that there are no significant differences for internal auditors to detect fraud among the three types of fraud. Moreover, there are no significant differences in detecting fraud between ACC and ANN of internal auditor accountability. To discuss the findings comprehensively, this article also presents a relevant literature review, the research method used and presentation of findings and conclusions.

## **2. LITERATURE REVIEWS**

SAS No. 99 asks the auditor to brainstorm when carrying out the audit plan, hopefully, it will result in a more effective audit procedure in detecting fraud (Hoffman and Zimmelman, 2012). Carpenter (2007) found that a number of ideas were generated through the brainstorming process and suggested that a brainstorming team communicating each other would enhance the idea through stimulation and synergy. A preliminary study of brainstorming was conducted in the psychology field by measuring the success of brainstorming activities through generating ideas. Current study emphasized the importance of generating creative ideas, high-quality ideas.

Rowatt et al. (1997) suggested that brainstorming effectiveness can be assessed through one that more than quantity, for example, whether those produced conform to organizational standards and produce a competent performance. Carpenter (2007) advised auditors to generate ideas about how fraud can occur and be hidden, before making a fraud risk assessment. He found that brainstorming brought auditors to generate high-quality ideas.

The results of Carpenter's (2007) study indicated that the brainstorming audit team generated ideas higher quality fraud than that produced by individual auditors before the brainstorming session. Next, the audit team generated new and qualified ideas about fraud during a brainstorming session. The results also showed an increase in fraud risk assessment ie audit team after the brainstorming session was significantly higher than the assessment given by individual auditors before the brainstorming session, especially when fraud occurs. A study conducted by Lynch et al. (2009) examined the effectiveness of computer media for brainstorming in the fraud context as mandated by SAS No. 99. The results showed that brainstorming effectiveness was significantly higher for brainstorming teams using electronically than traditional face-to-face methods. There was no significant difference in effectiveness between interactive electronic brainstorming and nominal electronic brainstorming. Risk assessment of post-brainstorming fraud was significantly higher than pre-brainstorming assessments. This suggested that brainstorming sessions mandated by SAS No. 99 have an effective effect.

Hoffman and Zimbelman's (2012) examined the effect of two interventions on auditor planning decisions in dealing with high fraud risk, ie strategic reasoning and group brainstorming. The results showed that strategic reasoning and brainstorming were able to bring auditors more effectively on modification of auditing standards. Research conducted by Hunton and Gold (2010) examined the results of three types of brainstorming procedures: nominal group, round robin, and open discussion of field experiments involving 150 audit clients and 2614 auditors. The results showed that the nominal brainstorming and round-robin groups resulted in an equivalent amount of unique fraud risk and increased comparably in planned audit hour, while open discussion brainstorming resulted in the least number of unique ideas and the smallest increase in the planned audit hour.

Research conducted by Brazel et al. (2010) developed a quality measure of brainstorming to test how the auditor's decision-making process on fraud. Using field survey data of the auditor brainstorming sessions, 179 auditors were involved. Respondents reported a considerable variation regarding the quality of brainstorming in practice. This study found some evidence that high-quality brainstorming improved the relationship between fraud risk factors and fraud risk assessment.

These results indicated that brainstorming benefits are not generally accepted. Psychological literature Schlenker et al. (1991) provided a theory that defined the potential of accountability and responsibility in enhancing performance effort. The accounting

literature Dezoort et al. (2006), derived by psychological literature provided empirical support for these theoretical relationships. For example, Dezoort et al. (2006) evaluated the auditor's judgments of materiality and found that accountability pressures can increase the time required for participants to complete tasks, length of justification and consideration of materiality of qualitative factors.

## **Hypothesis**

This study develops the results of Dezoort and Harrison (2008) studies which showed that external auditor's perception of responsibility for detecting positive fraud is related to the number of brainstorming procedures but on different subjects and cases. This study uses government internal auditors as respondents with fraud cases in the public sector. In this case, brainstorming is performed on fraud detection procedures by government internal auditors. Based on this framework, this research formulates the following hypotheses:

H1: Brainstorming effort of internal auditors in detecting fraud does not differ between fraudulent financial reporting, misappropriation of assets and corruption.

The results of Dezoort and Harrison (2008) showed that auditors who are under accountability pressure will brainstorm a higher fraud detection effort than auditors without accountability pressure. This is indicated by a high number of fraud detection procedures performed by accountable auditors. This indicates that

accountability pressure increases the individual effort and implements in his/ her assignment performance. Based on this framework, this research builds the following hypotheses two:

H2: Auditors given accountability pressure have a higher brainstorming effort than auditors without accountability pressure.

### **3. METHODOLOGY**

The participants are ninety-two internal auditors of the Indonesian government. The experiments were conducted during the functional education and training of internal auditors of the Indonesian government. Subjects were assigned randomly to experimental conditions. The experiment applied was a 3x2 between-subject design. The independent variable was a level of fraud type and accountability. We manipulated three level fraud types as FFR, MoA and CRR and accountability was manipulated as ACC and ANN. There are some tasks that participants must perform. Firstly, they were required to fill in their identities as an internal auditor at the government agencies in which they work and asked to select the accountability provided.

Secondly, they should understand the information about the government agency and fraud content that occurs therein. There are three types of fraud to be tested (FFR, MoA, CRR) in which participants were presented only one type of fraud for detection. All three fraud types described a current period of fraud in an area where the participants were conducting internal audit work. The FFR scheme,

the head of the health department has included third-party health fees retribution worth 200 million in the annual financial statements. This fraud occurs because he had been unable to collect third-party health fees for two years. The MoA scheme describes a situation where the head of the health office has committed a theft of cash by making fake purchases of pharmacy.

He used fake documents of certain pharmaceutical companies to place orders and bills on purchasing of unreal pharmacy. The CRR scheme illustrates that he has a health equipment procurement program by nepotism in selecting a company supplier and doing project value engineering. Participants were informed that the head of the health office is cheating by acting alone (not colluding) and the cheating is unknown to others. Accountability variable is conditioned on two levels: accountable and anonymous. Accountable participants are participants who respond to review by providing their personal identity either through their name or email address. While anonymous participants do not provide personal information and have no attempt to make contact with reviewers for their responses. The accountability pressure showed the response of personal information is considered to be a pressure placed by others such as senior management, audit committees, internal audit standards and others.

#### **4. RESEARCH FINDINGS**

Hypothesis one (H1) states that the brainstorming effort of internal auditors in detecting fraud does not differ between fraudulent financial reporting, misappropriation of assets and corruption. To test the hypothesis it uses one way ANOVA analysis tool. The test results can be seen in table 1.

FraudType	Descriptive			Hipothesis			
	N	Mean	Std. Dev	Levene Test		Test of Between Subjects	
				F	Sig	F	Sig
Fraudulent Financial Reporting	29	3,07	1,751	0,139	0,871*	0,500	0,608*
Missappropriation of Assets	29	3,07	1,791				
Corruption	34	3,44	1,637				

R Squared = ,011 (Adjusted R Squared = -,011)

Table 1: Brainstorming effort on Three Fraud Type Scenario

\* Significance at 0.05 level

Table 1 shows that based on descriptive statistical data, participants who are given fraudulent financial reporting scenarios are 29 people and have an average brainstorming effort to determine the number of audit procedures of 3.07 with a standard deviation of 1.751. Participants in asset misappropriation fraud type are 29 people and have an average brainstorming effort to determine the number of audit procedures of 3.07 with a standard deviation of 1.791. Finally, participants in corruption fraud type amounted to 34 people and have an average brainstorming effort to determine the number of audit procedures of 3.44 with a standard deviation of 1.637.

Absolutely, brainstorming effort to determine the number of audit procedures is different between participants that treated three different types of fraud. To see if this difference is real statistically further testing stages is performed. To test the hypothesis, it begins by examining the assumption that ANOVA (group) of independent variables has the same variance. From table 4.13, it can be seen that the F value Levene test of 0.139 with a probability of 0.871. As probability is more than 0.05, it can be concluded that all three groups have the same variance. Thus the assumption of ANOVA has fulfilled which variance is the same. One way ANOVA test result shows that F value on the test of between subjects is 0,500 with probability significance of 0.608. A probability value above 0.05 indicates that there is no significant difference in average between the three test groups. Thus it can be concluded that the average brainstorming effort to determine the number of audit procedures in detecting fraud among groups of three types of fraud does not differ significantly.

Based on the test results, it can be concluded that hypothesis 1 (H1) states that the internal auditor brainstorming effort in detecting fraud does not differ between fraudulent financial reporting, misappropriation of assets and corruption is statistically supported. The adjusted R squared value of -0.011 shows that variability of brainstorming effort fraud can only be explained by fraud type variability of -1.1%. Hypothesis two states that auditors given accountability pressure have a higher brainstorming effort than auditors without accountability pressure. To test hypothesis two (H2), it used analysis tools which is Independent Sample T Test with

software SPSS (Statistical Package for Social Sciences). The test results can be seen in table 2.

Accountability Pressure	Descriptive			Hypothesis			
	N	Mean	Std. Dev	Levene Test		Equal Variance Assumed	
				F	Sig	T	Sig
Accountable	43	3,19	1,736	0,009	0,926*	-0,107	0,915
Anonymous	49	3,22	1,711				*

Table 2: Brainstorming effort Based on Accountability Pressure

\* Significance at 0.05 level

Table 2 shows that based on descriptive statistical data, accountable participants are 43 people and has an average brainstorming effort (indicated by the number of audit procedure options) of 3.19 with a standard deviation of 1.736, while anonymous participants are 49 people and have an average brainstorming effort of 3.22 with a standard deviation of 1.711. In an absolute, brainstorming effort (shown through the number of audit procedure options) differs between accountable and anonymous participants (Indriastuti, 2019). To see if this difference is real statistically further testing stages is performed. To test the hypothesis, it begins by looking at the two group's samples variance whether it equals (equal variance assumed) or not by looking at Levene test values. From table 2, it can be seen that the F value Levene test is 0,009 with probability 0,926. As probability is more than 0.05, it can be concluded that both groups have the same variance.

Thus analysis test using different t-test uses the assumption of equal variance. The result of t-test shows that the t value on equal variance assumed is -0.107 with probability significance 0,915. As a

probability value above 0.05, it indicates there is no significant mean difference between the two test groups. Thus it can be concluded that the average brainstorming effort (shown through the number of audit procedure options) between the accountable and anonymous groups do not differ significantly. Based on the results of the tests, it can be concluded that hypothesis two (H2) states that auditors given accountability pressures have higher brainstorming effort levels than auditors without accountability pressures is statistically unsupported. This can be seen from the mean value of accountable participant brainstorming effort (3.19) that no higher than the mean value of annoying participants (3.22). It also can be seen from the significance of the t-test result ( $p$  0.915) which shows no significant difference.

## **5. CONCLUSION AND RECOMMENDATIONS**

Brainstorming effort is measured by the number of fraud detection procedures generated by auditors. Brainstorming is set out in SAS Audit Standards No. 99 that requiring auditors to conduct brainstorming sessions on any fraud audit. Hypothesis one states that the internal auditor's brainstorming effort in detecting fraud does not differ between fraudulent financial reporting, misappropriation of assets and corruption. The statistical result shows it supports the hypothesis that the average brainstorming effort to detect fraud among groups of three types of fraud does not differ significantly. This suggests that any type of fraud faced by the Indonesian government

internal auditors is not responded differently in terms of attempts to determine fraud detection procedures. This is related to phenomenon occurs in government internal auditor environment as pointed out by AAUPI Executive Director Sidik Wiyoto that 94 percent of government auditors cannot detect fraud.

This is based on data of Government Internal Supervisory Apparatus (APIP) based on Internal Audit Capability Model (IACM) approach to 331 APIP. Of the five levels in the IACM approach, 93.96 percent of supervisors are at level one and only 5.74 percent in the second level while only one APIP is at level III. Level one does not have the ability to detect corruption. This ability is owned by the supervisor after level II upwards. This phenomenon supports the result of this study which shows no difference in brainstorming effort in detecting fraud because of the number of respondents who participated in this study almost 70% still at the level I.

The results of this study differ from those of ACFE which showed the number of fraud detection procedures that represent brainstorming effort on asset misappropriation is higher than fraudulent financial reporting and corruption. In addition, the results of this study differ from Dezoort and Harrison (2008) studies that tested subject of private sector internal auditors with results suggested brainstorming efforts on misappropriation of assets higher than those of fraudulent financial reporting and corruption. The result of this study differs from the result of previous studies that show the quality of fraud detection procedures is higher after brainstorming sessions (Carpenter, 2007; Kord et al., 2017). However, the result of this study

supports research by Brazel et al. (2010), which offers theoretical and practical insights in brainstorming on fraud and also shows that the benefits of brainstorming are not generally accepted.

Hypothesis 2 states that internal auditors given accountability pressure have a higher brainstorming effort than auditors without accountability pressure. The test result shows there is no support for hypothesis 2. It means that there is no difference in the average perception of responsibility for detecting fraud between accountable and anonymous groups. The mean value of brainstorming effort (proxied through the number of audit procedures) of government internal auditors to detect fraud in the accountable group (3.19) is not significantly different from the anonymous group (3.22).

Thus the brainstorming effort to detect fraud between the two types of accountability pressure in the two auditor groups is no different. The result of this study differs from previous studies Dezoort and Harrison (2008) which showed that the number of fraud detection procedures in brainstorming effort sessions on accountable auditors is higher than that of the anonymous auditor. Dezoort and Harrison (2008) research conducted on internal auditors in the private sector indicated that accountability pressure can improve individual performance in performing tasks. In contrast to the result of this study, the internal auditor of the Indonesian government has no different effort in fraud detection either when given the accountability pressure or not.

This study was conducted in internal government auditors that different from private sector internal auditors. In the work environment

of government internal auditors, their status as a civil servant (PNS) is not tied to rewards and sanctions in performance measurement. In addition, this is in line with the concept of accountability by Rowatt et al. (1997) as a social contingency.

The results of a brainstorming study on hypothesis one and hypothesis two do not support for SAS audit standard 99 (AICPA) that regulates auditor's efforts in detecting fraud by involving auditor role in brainstorming group. The Audit Standard requires auditors to brainstorm sessions on any fraud-related audit (Brazel et al., 2010). Government agencies/regulators should be able to provide clear guidance and reference on risks and ways of detecting various fraud types cases faced by government agencies. Thus, although auditors face different types of fraud, it is expected that they will still have high responsibility and optimal effort in detecting any type of fraud case they have to deal with (Puspitasari et al., 2019; Varela et al., 2017).

In addition, related to accountability pressure role, by auditor review, the internal auditor is expected more responsibility and has high effort in detecting fraud. Such reviews may be from institutions such as BPKP (BPK) or BPK (Audit Board), AAIPI (Association of Indonesian Government Internal Auditors) or other authorized parties.

## **6. LIMITATIONS AND FUTURE RESEARCH**

The results of this study have limitations on the level of government internal auditors who tend to be at level one. Thus the

researcher cannot draw conclusions thoroughly at all levels of government internal auditors in Indonesia. It is expected that in the future, the researchers can use data at all levels of auditors so that the overall conclusion can be obtained. The brainstorming method of this research is limited to generating ideas method, not yet in the stage of evaluating ideas and incorporating ideas because this study is a preliminary study that examines the brainstorming effort of government internal auditors in Indonesia.

Through generating ideas method on brainstorming effort measurement, the researcher uses the measurement by counting the number/quantity of audit procedures selected and determined by participants to detect fraud. Researchers have not yet measured the quality of procedure choice. Thus in future research, it can make measurements on the quality of audit procedure selection using methods of evaluating ideas (incorporating ideas) and incorporating ideas (inserting ideas). In addition, related to accountability pressure role, by auditor review, the internal auditor is expected more responsibility and has high effort in detecting fraud. Such reviews may be from institutions such as BPKP (BPK) or BPK (Audit Board), AAIPI (Association of Indonesian Government Internal Auditors) or other authorized parties.

## **REFERENCES**

- ASARE, S., TROMPETER, G., & WRIGHT, A. 2000. **The Effect of Accountability and Time Budgets on Auditors' Testing Strategies.** Contemporary Accounting Research. Vol. 17, pp. 539–560. USA.
- BRAZEL, A., JOSEPH, F., TINA, D., CARPENTER, J., & GREGORY, J. 2010. **Auditors' Use Brainstorming in the Consideration of Fraud: Reports from the Field.** The Accounting Review. Vol. 85, Nº 4: 1273-1301. Netherlands.
- CARPENTER, D. 2007. **Audit Team Brainstorming, Fraud Risk Identification, and Fraud Risk Assessment: Implications of SAS No. 99.** The Accounting Review. Vol. 82, Nº 5: 1119-1140. USA.
- DEZOORT, T., & HARRISON, P. 2008. **The Effects of Fraud Type and Accountability Pressure on Auditor Fraud Detection Responsibility and Brainstorming Performance.** Working Paper. USA.
- DEZOORT, T., HARRISON, M., & TAYLOR, K. 2006. **Accountability and Auditors' Materiality Judgment Effects of Differential Pressure Strength on Conservatism, Variability and Effort.** Accounting Organizations and Society. Vol. 31, Nº 4/5: 373-390. Netherlands.
- GLOVER, S. 1997. **The Influence of Decision Aids on User Behavior: Implications for Knowledge Acquisition and Inappropriate reliance.** Organizational Behavior and Human Decision Processes. Vol. 72, Nº 2: 232–255. Netherlands.
- HOFFMAN, B., & ZIMBELMAN, K. 2012. **How Strategic Reasoning and Brainstorming Can Help Auditors Detect Fraud.** Current Issues in Auditing. Vol. 6, Nº 2: 25-33. USA.
- HOFFMAN, V., & PATTON, J. 1997. **Accountability, The Dilution Effect, and Conservatism in Auditors' Fraud Judgments.** Journal of Accounting Research. Vol. 35, pp. 227–238. USA.

HUNTON, E., & GOLD, H. 2010. **A Field Experiment Comparing the Outcomes of Three Fraud Brainstorming Procedures: Nominal Group, Round Robin, and Open Discussion.** The Accounting Review. Vol. 85, № 3: 911-935. USA.

INDRIASTUTI, H. 2019. **Entrepreneurial inattentiveness, relational capabilities and value co-creation to enhance marketing performance.** Giap journals. Vol 7. № 3. India.

Kord, H., Noushiravani, Y., Bahadori, M. D., & Jahantigh, M. 2017. **Review and Analysis of Telework Perspective in the Administrative Systems.** Dutch Journal of Finance and Management, 1(2), 44. <https://doi.org/10.29333/djfm/5820>

LYNCH, A., UDAY, S. MURTHY, J., & TERRY, J. 2009. **Fraud Brainstorming Using Computer-Mediated Communication: The Effects of Brainstorming Technique and Facilitation.** The Accounting Review. Vol. 84, № 4: 1209-1232. USA.

Puspitasari, L., In'am, A., & Syaifuddin, M. 2019. **Analysis of Students' Creative Thinking in Solving Arithmetic Problems.** International Electronic Journal of Mathematics Education, 14(1), 49-60. <https://doi.org/10.12973/iejme/3962>

ROWATT, W., NESSELROADE, J., BEGGAN, A., & ALLISON, D. 1997. **Perceptions of brainstorming in groups: The quality over quantity hypothesis.** The Journal of Creative Behavior 31: 131–150. USA.

SCHLENKER, B., WEIGOLD, M., & DOHERTY, K. 1991. **Coping with Accountability: Self-Identification and Evaluative Reckonings.** In The Handbook of Social and Clinical Psychology, C. Snyder and D. Forsyth (eds). pp. 96-115. Elmsford, NY: Pergamon Press. New York. USA.

Varela, M. L. R., Araújo, A. F., Vieira, G. G., Manupati, V. K., & Manoj, K. 2017. **Integrated Framework based on Critical Success Factors for E-Commerce.** Journal of Information Systems

Engineering & Management, 2(1), 4.

<https://doi.org/10.20897/jisem.201704>





UNIVERSIDAD  
DEL ZULIA

---

# opción

Revista de Ciencias Humanas y Sociales

Año 35, N° 20, (2019)

Esta revista fue editada en formato digital por el personal de la Oficina de Publicaciones Científicas de la Facultad Experimental de Ciencias, Universidad del Zulia.

Maracaibo - Venezuela

[www.luz.edu.ve](http://www.luz.edu.ve)

[www.serbi.luz.edu.ve](http://www.serbi.luz.edu.ve)

[produccioncientifica.luz.edu.ve](http://produccioncientifica.luz.edu.ve)