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Organizational culture, technological capacity, and data-driven decision-making: Basis for HEI innovation framework

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Abstract

The study aimed to determine the Data-Driven Decision-Making of the respondents, by creating a general depiction of the extent of their organizational culture, technological capacity, and data-driven decision-making in selected higher educational institutions in the Philippines. It utilizes a descriptive approach involving middle-level management who are involved in receiving the data, hence making data-driven decisions. A total of 149 officials participated in the study from both the academic and administrative departments. The questionnaire consisted of four parts, specifically the demographic profile, assessment of the organizational culture, determine the technological capacity, and the data-driven decision-making capabilities of the officials. The following statistical treatment were applied: Percentage, Weighted Mean, Pearson Product Moment Correlation Coefficient, ANOVA, and Regression Analysis. The results revealed that the respondents are mainly from Batangas campus, are above 40 years of age, has been in service for 16 years and above, Master's Degree holder, mostly are either from the Registrar's Office and MIS department, were regular employees, and, were administrative officials. For academic officials, the respondents were mostly department chairpersons, while for administrative officials, mostly were supervisors. Organizational culture and technological capacity influenced data-driven decision-making respectively. As for the ability of officials to make data-driven decision-making, they were literate on identifying and potential use of data, however this does not necessarily mean that proper utilization follows. There were no significant differences on the following: differences in responses on organizational culture when grouped according to profile variable, differences in responses on technological capacity when grouped according to profile variable and differences in responses on data-driven decision making when grouped according to profile variable. And lastly, there was highly significant relationship between organizational culture and technological capacity, organizational culture and data-driven decision-making, and technological capacity and data-driven decision-making.

Keywords: organizational culture, data-driven decision-making, technological capacity innovation framework

Organizational culture, technological capacity, and data-driven decision-making: Basis for HEI innovation framework

1. Introduction

Decision-making is simply the process of making a choice. However, making decisions is rarely simple and can be especially difficult in an organizational setting. One is not alone if he/she struggles to make a decision at work. Making decisions takes up a large amount of an executive's time—nearly 40%, on average. Even worse, they think the majority of that time is wasted. People struggle with decisions so much that they get exhausted from having to decide too much (McKinsey, 2023). Making poor decisions costs money, time, and productivity. Understanding the difference between someone who has a voice (provides input) and someone who has a vote (decides) is essential to decision-making. As such, the employees that have complete authority are the ones who solve issues and make wise decisions. With the increasing complexity and dynamic nature of business, managers and leaders are sometimes faced with making decisions quickly and with inadequate or incorrect data. (Smet, et al, 2020). Thus, it is this notion that led people to wonder how important these data or information really is in the quest for generating sound decisions.

There are various forms of data that can be collected. It can be gathered in one of two ways: either in a less formalized way, like through informal classroom observations and discussions, or in a more formal way, like through assessment results, surveys, and systematic classroom observations (sometimes called formal data). Additional data, such as evidence from educational research, is one example of this since studies indicate that this type of data may also be useful in guiding decision-making (Schildkamp, 2018). Strategic business decisions that align with one's goals, objectives, and initiatives can be influenced by data, measurements, and information through data-driven or fact-based decision-making. Business revolutions could come from data-driven decision-making. Further, earnings rise, inefficiencies fall, and businesses engage with their target consumers more effectively. Every day, individuals are empowered to make better decisions based on facts. However, the only way to do this is to choose the best analytics tool to find the next strategic opportunity.

According to Sailan et.al. (2022) workforce performance, workforce diversity, and organizational processes are all profoundly impacted by company culture. In each organizational arrangement, a deeper understanding of the institutional and physical distinctions in organizational performance and culture is necessary. When it comes to culture, ownership and control of companies are becoming more and more splintered; this is a phenomenon that is made worse by performance. Thus, determining the connection between organizational performance and culture is the aim of this. Power distance, individualism, and collectivism, avoiding ambiguity, and masculinity were the focus of the organizational culture. Decision-making, compensation structures, control structures, and job design all had an impact on organizational culture. The study provides evidence that businesses must recognize the value of corporate culture to achieve their objectives and increase the impact of organizational performance. The company needs to adopt data-driven decision-making as the norm, encouraging a curious and critical thinking culture. People of various skill levels participate in data-driven discussions and refine their data skills via application and practice. This essentially calls for a self-service strategy that allows consumers to retrieve the information they need while upholding security and governance. For employees to acquire data skills, training and development opportunities are also required. Finally, encouraging colleagues to adopt a data-driven culture and advocating for administrative practices will encourage others to take the same course.

According to Bac (2022), many enterprises need an infrastructure for information technology (IT). Modern corporate management operations like manufacturing, marketing, banking, and financing are under the purview of IT. A high functioning IS requires a well-designed IT infrastructure. If information systems (IS) are viewed as a manufacturing process, information can be considered the end product. Customers would not be happy with the product, and the business would lose both current and potential clients if the final product (information) cannot be

supplied within a specific lead time and does not satisfy their needs. By providing improved coordination and communication between various divisions and by lowering transaction costs inside a business, IT supports innovation activities. An effectively implemented IS, bolstered by a robust IT infrastructure, improves the performance of the organization's whole supply chain by achieving greater flexibility in all peer-to-peer processes. A community's and an organization's most important resource is information. All contemporary commercial organizations' managerial effectiveness is directly correlated with the effectiveness of the MIS employed by the company. Information system analysis, design, database architecture, and data processing are all included in MIS, a crucial component of IS. The effectiveness of MIS can be assessed using features like accurate reporting and timely and accurate information delivery to various management levels. An integrated human-machine system (MIS) is characterized as a means of supplying data to facilitate an organization's managerial tasks, operational activities, and decision-making processes.

According to a study by McRae (2019), technology tools offer data that is essential for making decisions. The instantaneous transfer and diffusion of information is made possible by popular technical tools like video conferencing, text messaging, and email. A faster pace of information distribution enables decision-making than previously. In a study by Henderson, et. al.,(2019), they discussed literacy as the ability to understand and use data to make informed decisions. It further stressed the importance of data literacy in the 21st century, and provides a framework for understanding data literacy, which categorically contains a framework that includes four dimensions of data literacy: Data fluency: The ability to understand and use data to solve problems and make informed decisions; Data reasoning: The ability to think critically about data and to draw conclusions from data; Data communication: The ability to communicate data effectively to others; Data ethics: The ability to use data in an ethical and responsible way.

The study also provides recommendations for how to improve data literacy. These recommendations include increasing access to data. Data should be made more accessible to people, so that they can use it to make informed decisions. Also providing data literacy education to where data literacy education should be provided to people at all levels, so that they can understand and use data effectively. Lastly, promoting data literacy culture, so that people are encouraged to use data to make informed decisions. The study concludes by arguing that data literacy is essential for success in the 21st century. The study also argues that data literacy is a journey, not a destination. People need to be constantly learning and improving their data literacy skills in order to stay ahead of the curve.

Objectives of the Study - The study aimed to determine the data-driven decision-making, or the decision-making of the respondents based on facts, by creating a general depiction of the extent of their organizational culture, technological capacity, and self-assessment of data-driven decision-making capabilities in selected higher educational institution in the Philippines. Specifically, it assessed organizational culture (in terms of values, employee empowerment, sense of purpose, recognition/appreciation and communication); determined its technological capacity (in terms of infrastructure, hardware and organizational innovation); identified the usage of data-driven decision making (in terms of data usage culture, data usage purpose and data literacy); tested the relationship of the variables; and developed a framework to improve data-driven decision-making implementation in the organization.

Conceptual Framework - The figure depicts the Conceptual Framework of the study based on an IPO model. In the said figure, the input describes the inherent characteristics of the respondent, in this case, the officials of a Higher Educational Institution. The said characteristics influences their understanding and utilization of the processes available to interpret he data. The said personal demographics include which campus they are from, their age, years in service, educational attainment, department assigned to, job status and nature of their unit. These play a role in identifying data and interpreting them based on the resources available in the campus such as the environment, the technology and how data are used. Specifically, the environment deals with organizational culture, which revolves around values, employee empowerment, purpose, recognition and communication. Similarly, technological capability involves infrastructure, hardware, and organizational innovation. Finally, data-driven decision-making processes revolve around its usage, which may be directly influenced by the culture, purpose and

literacy. The output, having utilized the said processes by the respondent gives rise to a work-related decision that is sound as it is based on facts or available information. Such decision can be said that they are derived from decision-making processes that are driven or anchored from available data.

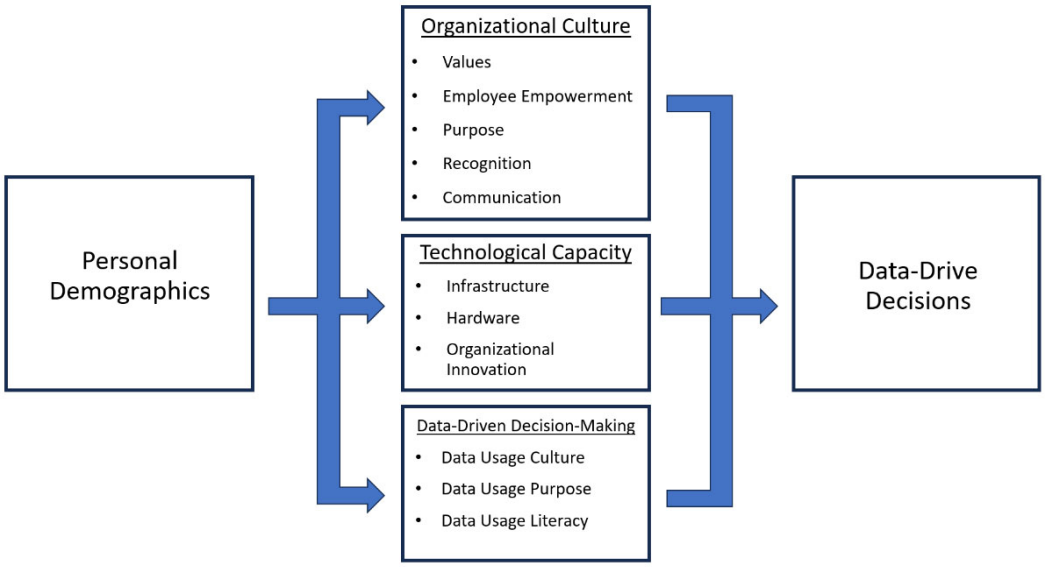

Figure 1. Conceptual Framework of Data-Driven Decision-Making

2. Methods

Research Design - The study utilized a quantitative descriptive approach as it tries to examine and understand a current phenomenon. According to the study of Siedlecki (2020), the purpose of descriptive studies is to portray individuals, events, or conditions as they naturally occur. Researchers conducting descriptive studies do not manipulate any variables but rather solely describe the sample under examination and/or the variables of interest. Descriptive studies aim to provide an accurate representation by observing and measuring without seeking to influence what is observed. This type of research design allows for the current state of the topic under investigation to be depicted without experimental intervention from the researcher. The findings from descriptive studies can help establish baseline information to compare against future studies where variables may be altered. Descriptive studies look the characteristics of a population; identify a problem that exist within a unit, an organization or a population; or look at variations in the characteristics or practices between institutions or even countries. As such it is used to systematically and accurately convey the facts and attributes of a given population or subject matter of interest. Through the distribution of survey questionnaires, the researcher sought to collect data from the respondents. This descriptive kind of research was useful in collecting the respondents' data efficiently.

Participants of the Study - The study was conducted in selected Philippine Higher Education Institutions involving middle-level management who are involved in receiving the data, hence providing feedback on the data acquired from faculty and personnel. The participants of the study were identified with the help of the HR department and mid-level managers who were working as department managers and division managers were approached to complete the study questionnaire. A total of two hundred forty-one (241) middle-level managers participated which included mostly the dean, associate dean, program head, and department chairs. Another set were administrative officials composed of directors, department heads, and supervisors, from the four campuses. Using the Raosoft sample size calculator, a size of at least 148 individual responses were needed for this study. This was based on a 95% confidence level, 5% margin of error and a response distribution of 50% i.e. assumption of normal distribution.

Data Gathering Instrument - The items per instrument were presented as descriptive statements, and respondents indicated the frequency with which each statement applies on a four-point Likert scale as 4.00-3.00 means Strongly Agree, 2.99-2.00 means Agree, 1.99-1.00 means Disagree and, 1.00-0.99 rating means Strongly

Disagree. The questionnaire is composed of four parts. Part I contains the demographic profile of the respondents. Part II contains the assessment of the Organizational Culture which was adopted from the study of (Marais,2016) which has five factors consisting of Values (5 items), Employee empowerment (5 items), Sense of Purpose (5 items), Recognition/Appreciation (5 items), and Communication (5 items). Part III measured the technological capacity which was adopted from the study of Dogan, et. al., (2021) and has three factors including Infrastructure, Hardware, and Organization Innovation. The last part is Data-driven decision making which was adopted from the study Dogan, et. al., (2021). It consists of Data Usage Culture (5 items), Data Usage Purpose (5 items), and Data Literacy (5 items). This was chosen as it dealt with a similar matter as this study, but the researcher chose to omit several questions not applicable to the current study such as ethnicity and other questions that are outside the scope of the current limitation of the study.

To test the reliability of the instrument used in the study, Cronbach's Alpha reliability coefficient was computed to determine how well the items in the questionnaire are internally consistent with each other. George, et. al., (2019) provided the rule of thumb for assessing Cronbach's Alpha value for a dichotomous or Likert scale instrument. This categorized the following alpha values: below 0.5 is unacceptable, between 0.5 to 0.6 is poor, between 0.6 to 0.7 is questionable, between 0.7 to 0.8 is acceptable, between 0.8 to 0.9 is good, and between 0.9 to .10 is excellent. This study used a reliability coefficient of 0.7 as the limit point for measuring reliability.

Factors for the organizational culture in terms of values got alpha values of 0.956, items related to employee empowerment got 0.837, items related to sense of purpose got 0.927, items related to recognition/appreciation got 0.846 and communication got 0.902. Factors for technological capabilities in terms of hardware and organizational innovation got an alpha value ranging from 0.907 to 0.922, and items related to infrastructure got 0.885. Lastly, factors for data-driven decision-making generate an alpha value ranging from 0.831 to 0.915. These results of the reliability test showed alpha values of more than 0.70 in all the variables used in which is the minimum recommended value (Johnson & Morgan, 2016). The values can be interpreted as ranging from "Good to Excellent" indicators of the instrument's reliability. Therefore, taking into account the results of the validity and reliability tests conducted, it can be confirmed that the instrument is highly reliable as it is free from random error and, thus, they can be capable of providing consistent results.

Data Gathering Procedure - To facilitate data-gathering, the researcher provided a letter to the university president for approval, and to the Vice President for Research and Academics of selected Philippine Higher Education Institution and underwent screening by the Research Ethics Review committee for compliance with their guidelines and protocol. The researcher also sought approval from the Human Resource Department of the different campuses for the distribution of survey questionnaires. The questionnaires were disseminated using Microsoft Forms and sent through social media applications and email until the desired number of participants was reached. This enabled the middle managers to access the questionnaire regardless of their location. Once done, their responses were immediately tabulated, and these were made available to the researcher in real time. This prevented factors such as distance or location in hindering the data gathering. The respondents were also informed that all their responses are kept confidential.

Ethical Consideration - The researcher saw no possible violation of norms and ethics in relation to determining the preference of learning modalities. Also, the researcher exercised due care in handling confidential information especially in obtaining the information of the respondents in order to avoid violation of privacy.

Data Analysis - To interpret the data effectively, the researcher employed the following statistical treatment; Percentage, Weighted Mean and Pearson's Correlation, t-Test for independent means, Analysis of variance and regression analysis. The percentage was used to determine part or portion in relation to its whole. This would reflect the population or census as to how many would yield to the questions being asked. Weighted Mean was used to determine the average frequency of the responses to the questionnaire to represent the whole of the respondents. Pearson's Correlation was used to test the relationship between the significant relationship of organizational culture and technological capacity. A method of measuring the association between variables of

interest that is based on the method of co-variance. It gives information about the magnitude of the association, or correlation, as well as the direction of the relationship.

3. Results and discussion

Table 1
Summary Table for Organizational Culture (N=148)

Sub-Variables	Weighted Mean	Std Dev	Interpretation	Rank
Values	3.41	0.48	Sometimes	3
Employee Empowerment	3.43	0.46	Sometimes	2
Sense of Purpose	3.44	0.53	Sometimes	1
Recognition/Appreciation	3.26	0.58	Sometimes	5
Communication	3.38	0.50	Sometimes	4
Overall Mean	3.38	0.45	Sometimes	

Legend: 1.00-1.49 (Never) 1.5-2.49 (Rarely) 2.53-3.49 (Sometimes) 3.5-4.00 (Always)

Table 1 depicts how organizational culture influences data-driven decision-making among the institutions' Officials. A composite mean of 3.38, interpreted as "Sometimes" was generated. Based on the results, officials may feel that their organization's culture promotes values, empowerment, a sense of purpose, and others. This can be a very positive thing, as it can help to ensure that decisions are made appropriately. On the other hand, officials may also feel that their organization's culture is not always conducive to effective data-driven decision-making. Hence, the organization should identify ways in which it can be leveraged to make better decisions. Among the components of Organizational Culture, the Sense of Purpose stands out as first in rank with a weighted mean of 3.44, this is followed by Employee Empowerment with a weighted mean of 3.43. Third in rank is Values, with a weighted mean of 3.41; Communication with a weighted mean of 3.38 and rank fifth is Recognition/Appreciation with a weighted mean of 3.26.

Table 2
Summary Table for Technological Capacity (N=148)

Sub-Variables	Weighted Mean	Std Dev	Interpretation	Rank
Infrastracture	3.39	0.53	Sometimes	2
Hardware	3.57	0.50	Always	1
Organizational Innovation	3.37	0.53	Sometimes	3
Overall Mean	3.44	0.44	Sometimes	

Legend: 1.00-1.49 (Never) 1.5-2.49 (Rarely) 2.53-3.49 (Sometimes) 3.5-4.00 (Always)

Table 2 depicts how technological capacity influences data-driven decision-making among the institutions' Officials. A composite mean of 3.44, interpreted as "Sometimes" was generated. According to Rashedi (2022), good technological solutions are the indispensable prerequisite for a data-driven organization. As such, the responses generated Hardware as the leading contributor to Technological Capacity with a weighted mean of 3.57. This was followed by Infrastructure with a weighted mean of 3.39, and the last is Organization Innovation with a weighted mean of 3.37. It is also based on the result that some of the technology used by the Officials must be updated in order to help improve data-driven decisions.

Table 3
Summary Table for Data Driven Decision-Making (N=148)

Sub-Variables	Weighted Mean	Std Dev	Interpretation	Rank
Data Usage Culture	3.24	0.48	Sometimes	3
Data Usage Purpose	3.42	0.52	Sometimes	2
Data Literacy	3.60	0.50	Always	1
Overall Mean	3.42	0.42	Sometimes	

Legend: 1.00-1.49 (Never) 1.5-2.49 (Rarely) 2.53-3.49 (Sometimes) 3.5-4.00 (Always)

In terms of making decision based on data, literacy was the identified characteristic that the Officials recognized among themselves, with a weighted mean of 3.60. This was followed by data usage purpose with a weighted mean of 3.42 and data usage culture with a weighted mean of 3.24. The results generated a composite mean of "Sometimes" meaning that although they are literate on the identifying and potential use of data, this does

not necessarily mean that proper utilization follows. This supports an article by Vogels (2020) wherein data Literacy Gap was imminent in organizations, citing a disconnect about what one knows and what one can do. A composite mean of 3.42 reflects the entirety of the said data-driven decision-making.

Table 4
Relationship Between Organizational Culture and Technological Capacity (N= 148 alpha = 0.05)

Variables	r_{xy}	p-value	Interpretation
Values			
Infrastructure	.645**	0.000	Highly Significant
Hardware	.424**	0.000	Highly Significant
Organizational Innovation	.704**	0.000	Highly Significant
Overall Mean TC	.697**	0.000	Highly Significant
Employee Empowerment			
Infrastructure	.598**	0.000	Highly Significant
Hardware	.394**	0.000	Highly Significant
Organizational Innovation	.613**	0.000	Highly Significant
Overall Mean TC	.631**	0.000	Highly Significant
Sense of Purpose			
Infrastructure	.638**	0.000	Highly Significant
Hardware	.368**	0.000	Highly Significant
Organizational Innovation	.671**	0.000	Highly Significant
Overall Mean TC	.660**	0.000	Highly Significant
Recognition/Appreciation			
Infrastructure	.673**	0.000	Highly Significant
Hardware	.470**	0.000	Highly Significant
Organizational Innovation	.719**	0.000	Highly Significant
Overall Mean TC	.731**	0.000	Highly Significant
Communication			
Infrastructure	.691**	0.000	Highly Significant
Hardware	.439**	0.000	Highly Significant
Organizational Innovation	.695**	0.000	Highly Significant
Overall Mean TC	.717**	0.000	Highly Significant
Overall Mean OC			
Infrastructure	.735**	0.000	Highly Significant
Hardware	.475**	0.000	Highly Significant
Organizational Innovation	.770**	0.000	Highly Significant
Overall Mean TC	.778**	0.000	Highly Significant

Table 4 displays the association between organizational culture and technological capacity, in which all the organizational culture's sub variables were found to be highly significant to technological capacity, with p-values lower than 0.05. This indicates that the higher the sub variables are for organizational culture, the higher the sub variables will be for technological capacity. Specifically, the more the culture develops its practice to use data in their field of work, the higher the tendency to improve technological capacity as this technology will be used more frequently in the mining of data (values – 0.697, employee empowerment - 0.631, sense of purpose – 0.660, recognition/appreciation – 0.731, communication – 0.717 and overall – 0.778).

Table 5
Relationship Between Organizational Culture and Data-Driven Decision Making (N= 148 alpha = 0.05)

Variables	r_{xy}	p-value	Interpretation
Values			
Data Usage Culture	.620**	0.000	Highly Significant
Data Usage Purpose	.617**	0.000	Highly Significant
Data Literacy	.502**	0.000	Highly Significant
Overall Mean DDC	.681**	0.000	Highly Significant
Employee Empowerment			
Data Usage Culture	.581**	0.000	Highly Significant
Data Usage Purpose	.510**	0.000	Highly Significant
Data Literacy	.363**	0.000	Highly Significant
Overall Mean DDC	.569**	0.000	Highly Significant

Sense of Purpose			
Data Usage Culture	.578**	0.000	Highly Significant
Data Usage Purpose	.513**	0.000	Highly Significant
Data Literacy	.415**	0.000	Highly Significant
Overall Mean DDC	.589**	0.000	Highly Significant
Recognition/Appreciation			
Data Usage Culture	.679**	0.000	Highly Significant
Data Usage Purpose	.618**	0.000	Highly Significant
Data Literacy	.485**	0.000	Highly Significant
Overall Mean DDC	.697**	0.000	Highly Significant
Communication			
Data Usage Culture	.716**	0.000	Highly Significant
Data Usage Purpose	.588**	0.000	Highly Significant
Data Literacy	.462**	0.000	Highly Significant
Overall Mean DDC	.690**	0.000	Highly Significant
Overall Mean OC			
Data Usage Culture	.719**	0.000	Highly Significant
Data Usage Purpose	.644**	0.000	Highly Significant
Data Literacy	.505**	0.000	Highly Significant
Overall Mean DDC	.731**	0.000	Highly Significant

Table 5 illustrates the association between organizational culture and data-driven decision-making, in which all the organizational culture's sub variables were found to be highly significant to data-driven decision-making, with p-values lower than 0.05. This indicates that the higher the sub variables are for organizational culture, the higher the sub variables will be for data-driven decision-making. Specifically, the more the culture develops its practice to use data in their field of work, the higher the tendency to increase data usage for daily decision making, thereby improving the progress and operations of the institution (values – 0.681, employee empowerment - 0.569, sense of purpose – 0.589, recognition/appreciation – 0.697, communication – 0.690 and overall – 0.731).

Table 6

Relationship Between Technological Capacity and Data-Driven Decision Making (N= 148 alpha = 0.05)

Variables	r_{xy}	p-value	Interpretation
Infrastructure			
Data Usage Culture	.590**	0.000	Highly Significant
Data Usage Purpose	.573**	0.000	Highly Significant
Data Literacy	.474**	0.000	Highly Significant
Overall Mean DDC	.641**	0.000	Highly Significant
Hardware			
Data Usage Culture	.443**	0.000	Highly Significant
Data Usage Purpose	.387**	0.000	Highly Significant
Data Literacy	.268**	0.001	Highly Significant
Overall Mean DDC	.430**	0.000	Highly Significant
Organizational Innovation			
Data Usage Culture	.689**	0.000	Highly Significant
Data Usage Purpose	.656**	0.000	Highly Significant
Data Literacy	.548**	0.000	Highly Significant
Overall Mean DDC	.742**	0.000	Highly Significant
Overall TC			
Data Usage Culture	.676**	0.000	Highly Significant
Data Usage Purpose	.635**	0.000	Highly Significant
Data Literacy	.508**	0.000	Highly Significant
Overall Mean DDC	.713**	0.000	Highly Significant

**. *Correlation is significant at the 0.01 level (2-tailed).*

Table 6 displays the association between technological capacity and data-driven decision-making, in which all the technological capacity's sub variables were found to be highly significant to data-driven decision-making, with p-values lower than 0.05. This indicates that the higher the sub variables are for technological capacity, the higher the sub variables will be for data-driven decision-making. Specifically, the more the capability to utilize technology improves, the higher the tendency to increase usage of data for decision-making. (infrastructure–0.641, hardware-0.430, organizational innovation–0.742, and overall – 0.713).

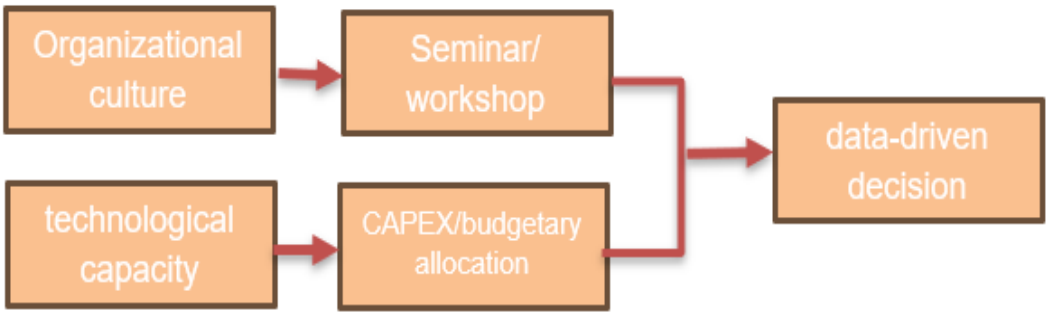

Figure 2. HEI Innovation Framework

Model Framework

The data-driven decision-making framework being proposed is an adaptation of Silverman(2020) SMARTER Framework model. Revisions were incorporated based on the results of the study, giving highlight to Organizational Values, Communication and the organization's initiatives for Technological Innovation, and customization based on the applicability of the author's immediate environment. The framework is particularly useful as a guide for organizations in their transition from their current state to embracing data-driven decision-making. Giving emphasis on these three factors, a study by Weigert (2017) from the Massachusetts Institute of Technology (MIT) provides a description of the following findings.

Organization and Culture - While leadership has a crucial role in championing a data-driven culture, a company's transition can only succeed if existing people, work-flows, processes and incentives also receive adequate training and transformational treatment. Right from the offset, an organization must be structured in a way that efficiently aligns information flows with access and decision rights.

Communication - the one with the most impactful long-term effects is the openness to share data and resources. To communicate is to generate ideas, and to generate ideas is to be open to new possibilities.

Technological Innovation - for decades all elements of computing (storage, memory, processing) have become more powerful and affordable, which may have now may reached a culmination where some elements are virtually free. In fact, some data scientists argue that it may now actually be cheaper to keep data than to delete it. On top of the abundance of data and the unprecedented computing power, data engineers have developed sophisticated software and algorithms that are often free to use, share and adapt for everybody. In sum, the value that is inherent in data has become accessible as never before.

Data powers insights, decisions, and actions, and people are only scratching the surface of the value that can be created, captured, and redistributed through data-driven decision-making.

Figure 2 shows the HEI innovation framework to strengthen the implementation of data-driven decision-making, organizational culture should create the desire to seek the data first as the basis of facts before all manner of engagement. This may be done through a form of seminars and/or workshops. In terms of technological capacity, the management are encouraged to allocate budget for capex to replace outdated or obsolete equipment, hence improve data generation and data mining capabilities. This will then lead to more equipped institutional officers in data-driven decision making capabilities.

4. Conclusions and recommendation

Respondents are mainly from Batangas campus, above 40 years of age, have been in service for 16 years and above, with master's degree, are employed either from the Registrar's Office and MIS department, and are regular administrative officials. For academic officials, the respondents are mostly department chairpersons, while for

administrative officials, mostly are supervisors. Organizational culture is observed as an influencing factor that is Sometimes conducive to the implementation of data-driven decision-making. The sub variables sense of purpose, and employee empowerment are the biggest contributor of the organizational culture in making a data-drive decision, while recognition/appreciation is the least among the identified sub variable. Technological capacity is categorized as Sometimes a useful tool in the implementation of data-driven decision-making. The sub variable hardware serves as the most significant tool, followed by infrastructure, and the last is organization innovation. Subsequently, the usage of data-driven decision-making as the act itself in the implementation among the organizations' officials, is categorized as Sometimes practiced. The sub variable data literacy ranks first, followed by data usage purpose and the last is data usage culture.

Based on the results on the differences in responses when grouped according to profile variables, it was found out that for organizational culture, there is no significant difference on which campus they are from, their educational attainment, which unit they are assigned to (college or a department), nature of work, as an academic official, and as an administrative official. This means that the organizational culture does not have a significant effect on the above-mentioned profile variables. However, there is a significant difference noted among age, length of service, and job status, giving the impression that the organizational culture has a significant effect on the said profile variables. On the other hand, for technological capacity when grouped according to profile variable, it was found out that there is no significant difference on which campus they are from, their educational attainment, which unit they are assigned to (college or a department), their job status, their nature of work, as an academic official and as an administrative official. This means that technological capacity does not have a significant effect on the above-mentioned profile variables.

On the other hand, there is a significant difference noted among age and length of service giving the impression that technological capacity has a significant effect on the said profile variables. For data-driven decision-making when grouped according to profile variable, it was found out that there was a significant difference on which unit they are assigned to (college or a department), as an academic official and as an administrative official. This means that the above-mentioned profile variables have a significant effect on the data-driven decision-making capability of officials. On the other hand, the rest of the variables have no significant difference, hence no significant effect on the data-driven decision-making capability of officials. Based on results, there is a high significant relationship or a direct link between organizational culture and technological capacity, and this is true all throughout its sub variables from values, employee empowerment, sense of purpose, recognition or appreciation and communication when assessed with infrastructure, hardware, and organization innovation. Subsequently, there is also a high significant relationship or a direct link between organizational culture and data-driven decision-making, and is true all throughout its variables from values, employee empowerment, sense of purpose, recognition or appreciation and communication when assessed with data usage culture, data usage purpose and data literacy. And as per results, there is also a high significant relationship or a direct association between technological capacity and data-driven decision-making, and is true all throughout its variables from values, employee empowerment, sense of purpose, recognition or appreciation and communication when assessed with data usage culture, data usage purpose and data literacy. A handful of sub variables stood out as predictors of data-driven decision-making. In the quest to improve decision-making based on data or facts, values as the guiding principle of the organizational culture plays a major role in the behavioral development to foster utilization of data. Since values permeate everything, people do, inculcating sensible and fact-checked data helps improve work and life. Similarly, evidence-based communication can overcome biases, or help refine their gut feeling. Hence, communication serves as the basis of channeling proper data transfer, whether it is vocal, digital through email or text messages, the appropriate means and proper process of communication should be observed. Lastly, organizational innovation, which drives people to pursue technological improvement, will not only make the data gathering easier, but the transmittal, usage and eventually decision-making a lot easier. Technology (hardware and software alike) when innovated can process information quicker.

The management may assess current technological capacity as compared to industry wide capability to determine whether the institution is lagging behind. Thus, make plans for improvement to better utilize data-driven

decision making. Innovators may implement the model developed, identify weakness, and improved on it in order to increase productivity and efficiency for future users of the said model. Educators or faculty members may identify objectives, progress monitoring, identify low-performing students, and planning instruction by utilizing the most significant data, hence derive better decisions, and to align instruction to standards. Future researchers may consider getting the responses of non-ranking employees as subjects of the study to assess their capability. In this way the outcome of the new study may be able to assess the capability of the entire network of HEIs in conjunction with this study. The management may assess the feasibility of establishing a unit that oversees data-driven decision-making, or to expand the role of institutional planning, especially if there are plans for ISO, lean six sigma accreditation in the future which serves to ascertain minimal revisions of documentations or activities.

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