Journal of Information and Knowledge Management (JIKM) Volume 12 Number 1 (2022)

The Effective Utilization of Internet Bandwidth in Organizational Demand Services and Applications

[1]Adamu Abubakar and [2]Wan Nurul Izza Wan Husin

[1]Research Unit 9: Computational Intelligence, Department of Computer Science, International Islamic University Malaysia, 53100 Kuala Lumpur, Malaysia

[2]Department of Psychology and Counselling, Faculty of Human Development, Universiti Pendidikan Sultan Idris (UPSI) 35900 Tanjong Malim, Perak, Malaysia

adamu@iium.edu.my, wannurulizza@fpm.upsi.edu.my

Received Date: 23 February 2022
Accepted Date: 19 March 2022
Published Date: 4 April 2022

Abstract. This research evaluates the sustainable utilization of Internet bandwidth usage and proposes a framework for its study. Understanding how much internet bandwidth is required for business and individual use and to what extend individual users have to be familiar with it, is very important. The study seeks to (1) measure the relationship between organizational learning and effective utilization of internet bandwidth; (2) assess the relationship between organizational learning and organizational performance; and (3) investigate the mediating effect of effective utilization of internet bandwidth in influencing the relationship between organizational learning and organizational performance. A reasonable sample population (n=318) is selected from those Malaysian business firms that use Internet bandwidth. Structural equation modeling (SEM) was utilized to test the relationship among study variables. Further analysis indicates that the results support certain hypotheses. Organizational learning is found to be of critical importance in the effective utilization of Internet bandwidth. However, the effective utilization of bandwidth does not mediate the effect of the relationship between organizational learning and organizational performance. This can be explained by the fact that learning the use of Internet bandwidth improves individual usage and better decision-making in choosing Internet bandwidth-demand-services and applications of an organization, yet does not significantly increase the operational and financial performance.
Keywords: Effective Utilization, Internet Bandwidth, Internet Bandwidth use, Internet Bandwidth requirement

1 Introduction

The advancement and complexity of computer programs and hardware devices that require Internet bandwidth has forced users to familiarize themselves with the complexities of those applications and their effective utilization. Individuals and organizations require some level of expertise when managing applications or subscribed services that use Internet bandwidth. Businesses have to look closely into the matter of Internet bandwidth seriously in order to be able to assess their performance. Learning positively influences the use of Internet bandwidth as it reflects a process through which an individual or organization is able to gather the relevant facts related to the management of Internet bandwidth meant for Internet-bandwidth-demand-services and applications. Viewed from a strictly psychological perspective, learning in general is defined as a process of permanent changes in behavior as a result of experience (Boud et al., 2013; Mitchell and Larry, 2021). Certain skills are acquired in such a way that the behavior is modified (Sullivan, 2000; Santori et al., 2021). The acquisition of a skill or certain know-how involves that what is learned (knowledge) and the way how it is learned (learning process) which are primarily influenced by cognitive dynamics that lead to dynamically robust outcomes of learning (Koponen et al., 2016; Kaso et al., 2021).

The organizational learning of matters related to managing Internet bandwidth for the Internet-bandwidth-demand services does not differ substantially from the general organizational learning process. However, there is more to the acquisition of knowledge by individuals when it comes to organizational learning. Organizations belonging to the same activity sector may apply very different learning practices (Silva et al., 2017). Despite the existing Internet policies and monitoring the employees' use of Internet bandwidth, the employees may still abuse it (Stanto, 2002) out of ignorance and thus negatively affect the organization's decision-making process and its performance. Thus, organizational learning in the area of services and applications requiring Internet bandwidth constitutes a crucial factor. It is the responsibility of any organization to ensure that its employees are adequately trained and in return achieve their objectives (Roughton and Crutchfield 2011; Amrutha and Geetha, 2021). Learning in an organization is part of adding skills that can lead to enhanced performance (Jones, 2007; Burhan et al., 2021). Especially when it comes to Internet bandwidth, individuals and organizations are expected to be familiar with the Internet bandwidth requirements for Internet bandwidth-demand-services and applications. The amount of Internet bandwidth an organization or individual needs is based on the tasks it is required to perform. In other words, the more online transactions are required as part of the organizational tasks, the more the Internet bandwidth is needed. However, different organizations may have different priorities in terms of their Internet bandwidth usage.

Previous studies identified a number of factors that influence organizational learning and also assessed and evaluated the impact of organizational learning on various business constructs (Salarian et al., 2015; Jiménez-Jiménez and Sanz-Valle, 2011). Details on the features of Internet bandwidth, round trip time, and its variants have been described in Zhang et al. (2021). Some studies investigated the extent to which learning more about the Internet bandwidth usage impacts both the business and the individual use and allows for more informed decision-making when it comes to the

Internet bandwidth-demand services and applications (Zheng et al., 2016; Chen et al., 2017; Idika et al., 2021). Crucial in this context is the conceptualization of the variables "innovation" and "performance" that are found to be positively interrelated with organizational learning (Jiménez-Jiménez and Sanz-Valle, 2011; Sasikala and Sakthivel, 2021). Whenever a new feasible idea (Innovation) is established in an organization, the organizational performance tends to increase (Saadat and Saadat, 2016). Organizational learning also has a positive impact on organizational commitment (Salarian et al., 2015). An analysis of the relation between managerial ties on firm performance is given in Peng and Luo (2000) who argue that firms perform better if there exists "a better understanding of the relationship among managerial ties, strategic initiatives, and firm performance". Calontone et al. (2002) use the four items of "commitment to learning", "shared vision", "open-mindedness", and "intra-organizational knowledge sharing" to measure the learning orientation. Lee et al. (2008) find that the use of Internet bandwidth is influenced by the Internet policy. Dhinnesh et al. (2021) highlight the important of efficient bandwidth allocation, whereas, Patel et al. (2021) revealed the need for effective utilization of Internet Bandwidth. The use of Internet bandwidth and several other issues associated with it are addressed in many studies (Lenhart et al., 2010; Zheng et al., 2016; Chen et al., 2017; Ganapathy, 2021; Daase et al., 2021).

The necessity of understanding how much internet bandwidth is required for business and individual use in addition to understanding how it is linked to the organizational performance is crucial. This study attempts to determine how well the individual users in an organization truly understand their own Internet bandwidth demand services and applications. For most organizations, the performance measure constitutes the most important criterion of success. Therefore, both learning and the Internet use are conceptualized to be related to each other and also related to the organizational performance in order to determine the relationship between organizational learning and managing Internet bandwidth for the Internet-bandwidth demand services and applications.

2 Theoretical background

This research is based on the organizational learning theory, organizational performance theory and resource utilization theory or resource-based view. Learning according to the organizational learning theory is based on Argyris and Schön (1996) who view it as a product of organizational inquiry and as the process of the production, absorption, and dissemination of knowledge within an organization. This implies that if an expected outcome deviates from the normal and expected, the organization has to investigate this abnormality and devise an appropriate solution. There exist three levels of organizational inquiry namely single loop learning, double loop learning, and deuteron-learning. Shrivastava (1983) understands organizational learning based on institutionalized experience, shared assumptions, adaptive learning, and development of knowledge. Pawlowsky (2001) focuses more on the "adaptation and action-oriented perspectives" toward knowledge acquisition while Edmondson and Moingeon (1998) offer their theory in the form of quadrants, the first quadrant representing the "residues", the second quadrant "communities", the third quadrant "partic-

ipation" and the last quadrant "accountability". With due acknowledgment of the above mentioned theories on organizational learning, this research adopts "commitment to learning", "shared vision", "open-mindedness", and "intra-organizational knowledge sharing" from the four component of learning orientations proposed by Calontone et al. (2002) in order to investigate the impact of learning on organizational performance and the effective use of Internet bandwidth.

Organizational performance directly underlines the actual output or outcome of an organization as measured over a certain period of time, yet without specific regard to the various facets of the organization's goals and objectives. If some objectives or goals are met and others are not, it is difficult to determine the performance measure. In general, business firms understand the performance measure in terms of "action" that is the behavioral aspect and an outcome aspect of performance as reflected in the facts and figures (Campbell et al., 1993). Combs et al. (2005) define the operational performance within the organizational performance as the entire non-financial outcomes of organizations. Hamann et al., (2013) views organizational performance on the basis of the four dimensions of profitability, liquidity, growth, and stock market performance. This research adopts the view developed in Mejia et al. (2010) and Salim and Sulaiman (2011) on organizational performance which differentiates between the financial and non-financial aspects. Financial performance (FP) is defined as quantitative information expressed as a monetary unit while non-financial performance (NFP) is defined as qualitative information expressed as a non-monetary unit (Mejia et al., 2010). The financial performance is defined as a quantitative measure where information on the financial aspects of the organizational output are expressed as a monetary unit, whereas the non-financial performance is defined as a qualitative measure that indicates the output obtained and expressed as a non-monetary unit as described in Combs et al. (2005) as an operational performance. Hence, this research is aimed at investigating if specific learning (meaning the acquisition of certain skills and know-how) and the effective utilization of Internet bandwidth influence the performance measure.

Resource utilization theory was initially proposed to satisfy all criteria for the theory of productivity by Booty in 1975. Later, a more focused approach on the socio-economic factors was proposed by Maheshvarananda and Branch (2010) in connection with the concept of sustainable agriculture and the proper utilization of natural and human resources. In essence, the theory attempts to raise awareness of the future prospects and goals of human society as a whole. The Progressive Utilization Theory promotes the welfare and development of every person by determining the minimum necessities of an individual and by properly utilizing the natural and human resources. Linked to business and business goals, Penrose (1995) established a resource-based view theory according to which an organization combines its available resources in a way that it becomes a firm-specific advantage. This approach was modified by Wernerfelt (1984) who applied Porter's (1980) competitive forces model on resources instead of products. In the view of Barney (2002) this method gave a competitive advantage in terms of value, rarity, imitability, and organizational embeddedness. Hence, a successful organization was expected to exploit all its available resources and capabilities. The key aspect of the resource-based view theory consists of the

organization's use of its resources in order to exploit the existing opportunities. Such an organization is thus more likely to achieve a competitive advantage over those organizations that fail to do so (Ray et al., 2004). Internet bandwidth constitutes a resource and thus, the effective utilization of Internet bandwidth is conceptualized into the requirement, use and priority. The impact of learning on effective utilization as well as organizational performance is measured within the framework and according to the established precepts of this theory.

3 Conceptualization and Hypotheses Formulations

The application of algorithmic techniques in utilization of Internet Bandwidth has been revealed in Abel et al. (2021). This research investigates the impact of organizational learning on organizational performance and the mediating role of the effective utilization of Internet bandwidth. The influence of organizational learning on the effective utilization of Internet bandwidth is also examined. The dependent variable for this research is organizational performance, while organizational learning and effective utilization of Internet bandwidth are taken as the independent variables. The hypothesized conceptual model of 'Effective utilization of internet bandwidth' is presented in Fig. 1.

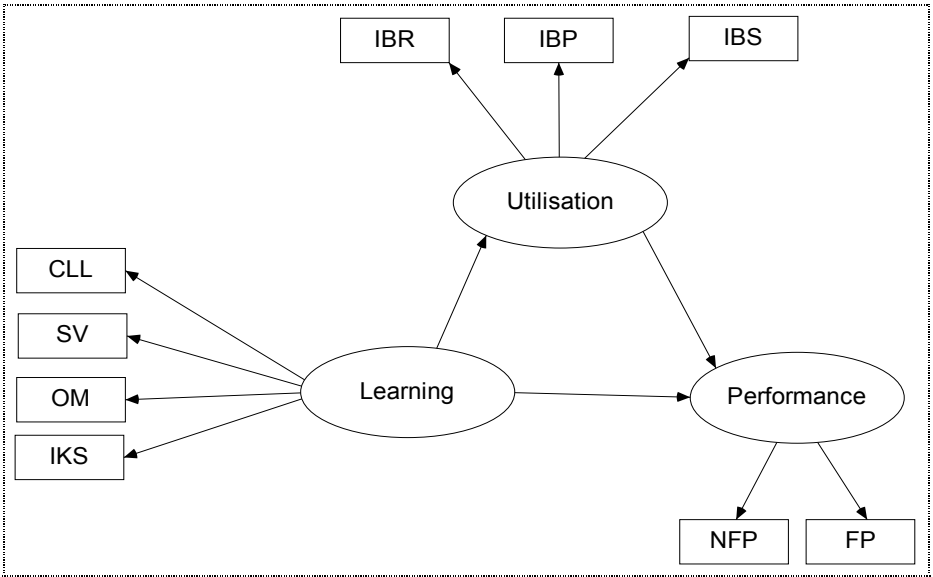

Fig 1. Proposed structural model of 'Effective utilization of internet bandwidth

IBR = Internet Bandwidth Requirement, IBP = Internet Bandwidth Priority, IBS = Internet Bandwidth Demand Services, CLL = Commitment to Learning, SVV = Shared Vision, OMM = Open-mindedness, IKS = Intra-Organizational Knowledge Sharing, NFP = Non-Financial Performance, FPP = Financial Performance

Independent Variables

Intra-Organizational Knowledge Sharing

Intra-organizational knowledge sharing has to do with intra-organizational advice relations (Agneessens and Wittek, 2012) and intra-organizational networks (Lee and Lee, 2015). It involves the combination of beliefs or behavioral routines with contingencies of inter-organizational knowledge sharing (Loebbecke et al., 2016). In terms of working with Internet-bandwidth demand services and applications, the construct "intra-organizational knowledge sharing" reflects the real life scenario in which an organization obtains the required know-how and information from different sources. Critical to this is the knowledge that the individuals already possess since the knowledge of an organization consists of the knowledge of the people running the organization (Nonaka, 1994). Therefore, the perception of the shared know-how related to working with Internet-bandwidth demand services and applications within the organization can be measured and evaluated based on the details obtained from those individuals. Such an approach is taken in Calontone et al. (2002) where intra-organizational knowledge sharing is used as a variable measuring learning orientation. The analysis of the relationships indicates a positive significant impact of intra-organizational knowledge sharing on learning orientation. The studies that evaluate firm innovations (Gunday et al. 2011; García-Morales et al. 2012) also use intra-organizational performance as a key variable for measuring the impact of innovation in an organization. In line with this approach, this study adopted "intra-organizational knowledge sharing" from Calontone et al. (2002) to measure the effective utilization of Internet bandwidth and its impact on organizational performance. Hence, the following hypotheses are formulated:

H_{1a}: Intra-organizational knowledge sharing is positively related to the effective utiliztion of Internet bandwidth.
H_{1b}: Intra-organizational knowledge sharing is positively related to the Internet bandwidth requirement.
H_{1c}: Intra-organizational knowledge sharing is positively related to the Internet bandwidth priority.

Shared Vision

Shared vision constitutes one of the four components of learning orientations proposed by Calontone et al. (2002) previously used in Hurley and Hult (1996); Hult and Ferrell, (1997) and Hult, (1998). Calontone et al. (2002) justify their use of the construct with the words that "learning cannot occur unless an organization has an effective and efficient system of information sharing". Thus, for the individuals working in an organization to recognize the effective use of Internet bandwidth for completion of their work-related tasks, constructive relationships need to be established among the individuals in order to exchange and share the relevant information (Akgun et al., 2007). For instance, the completion of multiple transactions with a fluctuating demand of Internet bandwidth at the same time requires the individual to rely on bandwidth and not mere Internet service subscription (Hilbert, 2016). Sharing and exchange of this kind of knowledge among the organization's employees can give it a

competitive edge and thereby sustainability in the highly competitive markets (Salim and Sulaiman, 2011).

This research adopted the variable "shared vision" in order to measure how individuals engage in teamwork when handling services and applications that require Internet bandwidth. This behavior supports the development of a group problem solving culture and reduces the level of reliance on the organization's technical team for handling Internet bandwidth-demand services and applications. Other studies use "shared vision" as a construct and find that shared vision contributes positively towards the effective organizational commitment and job satisfaction (West and Bocârnea, 2009). Also developing a shared vision is found to enhance the level of innovativeness of the firm (Expósito-Langa et al., 2015). Shared vision is also found to be positively related to competency (Gagné, 2009). For this reason, the present research is proposed to focus on the skill to effectively utilize the Internet bandwidth for the Internet bandwidth-demand services and applications in order to measure the influence of shared vision. The following hypotheses are formulated:

H1d: Shared vision is positively related to the effective utilization of Internet bandwidth.
H1e: Shared vision is positively related to the Internet bandwidth requirement.
H1f: Shared vision is positively related to the Internet bandwidth priority.

Commitment to Learning

In any organization, the commitment to learning is considered as an asset. If it is maintained it leads to various favorable organizational outcomes (Hanaysha, 2016). It is generally perceived as an avenue for the organization to promote learning. Calontone et al. (2002) uses "commitment to learning" as one of the four components of learning orientations. It is linked directly to the amount of learning that an organization is able to achieve. In general, organizational commitment is found to be significantly related to job satisfaction, and both are directly associated with organizational profitability and superior competitiveness (Abdullah and Ramay, 2012). Therefore, commitment to learning can improve the understanding of the organization's business goals (Ussahawanitchakit, 2008). Previous research uses "commitment", the most important aspect being the relationship between the organization's commitment and the work environment. Both variables are found to be positively related to the organization's commitment to learning. Hanaysha (2016) argues that the more individuals are engaged with their work environment, their higher their commitment to the organization (Danish et al., 2013), similarly, Billon et al. (2021) reveals that educational disparities have an impact on Internet use. Thus, engaged individuals are generally more committed to their organization (Schaufeli and Bakker, 2004). This concept can be applied to Internet bandwidth whereby the variable "commitment to learning" is proposed to measure the extent to which the organizational learning culture towards Internet bandwidth-demand service can be considered as a key factor in predicting the overall employee commitment toward the organization. The commitment to learning may also influence the effective individual utilization of Internet bandwidth. Hence, the following hypotheses are formulated:

H1g: Commitment to learning is positively related to the effective utilization of Internet bandwidth.
H1h: Commitment to learning is positively related to the Internet bandwidth requirement.
H1i: Commitment to learning is positively related to the Internet bandwidth priority.

Open-Mindedness

Open-mindedness has directly to do with the individuals' attitudes and behavior. This construct is used in Calontone et al. (2002) as part of the four components of the learning orientations. It reflects the willingness and the ability of individuals within an organization to accept new ideas. Usually it is placed on the top of any list of the intellectual or "epistemic" virtues (Riggs, 2010). Open-mindedness has been used in this study to examine the individual perceptions of the need to effectively utilize Internet bandwidth and measure each internet bandwidth-demand service and application used in an organization. In order for this to happen, individuals must have some level of openness to the organizational needs and able to recognize the need for removing functional barriers. They have to be willing to cope with and adapt to the rapid rate of the changing technology. Previous research studies use the variable "open-mindedness" to generate a number of valuable findings. Spiro et al. (2007) confirm that "an open-minded organization promotes new and innovative ideas and procedures, which in turn contributes to the achievement of competitive advantage". Barak and Levenberg (2016) establishes that flexibility is a "higher order thinking skill essential for learning in technology-enhanced environments" and "flexible thinking in learning is the ability to be open-minded and adapt to new learning methods". Open-mindedness in learning refers to "an individual with a high inclination to be open to new ideas and experiences will most likely try new learning technologies and easily adapt to new ways of learning" (Barak and Levenberg, 2016). In order to build on this finding and investigate if this matter also applies to working with Internet bandwidth-demand services and applications, the following hypotheses are formulated:

H1j: Open-mindedness is positively related to the effective utilization of Internet bandwidth.
H1k: Open-mindedness is positively related to the Internet bandwidth requirement.
H1l: Open-mindedness is positively related to the Internet bandwidth priority.

Organizational Internet Bandwidth Requirement and Priority

The Internet bandwidth requirement may not be the same for two or more companies offering the same services and using the same Internet bandwidth demand application. This is because the amount of Internet bandwidth an organization needs is determined by its online activities. The ratio of an organization's online activities and the Internet bandwidth requirement has to be stable. If organizational tasks require too many online transactions and the organization has too little internet bandwidth, it may cause the day-to-day activities to come to a stand-still at peak times. Although different organizations may have different usage priorities in terms of the Internet band-

width, the rule is that the more the speed the better the services that depend on Internet bandwidth (Lawrence, 2008). In many cities and also in the rural areas, high-speed internet bandwidth is being deployed. It requires that individual users and organizations rely on measuring bandwidth and not merely on the subscription count (Hilbert, 2016). In many cases, internet bandwidth needs for rural areas are different from urban areas, and urban consumers are willing to pay higher rates because they make more intensive use of the Internet (Savage and Waldman, 2009). This has raised the question of how much internet bandwidth is necessary and appropriate for business and individual usage. Individuals can base their decision on their capability whereas organizations base their decision on their actual business requirements. Organizations need to have a proper mechanism in place to respond to the ever-increasing demand for internet bandwidth in order to effectively counter the competition. The organizational output is directly developed on the basis of input made by its members or anybody who wishes to contribute (Hill, 2014). Previous studies show that heavy Internet bandwidth consuming connections are significantly related to usage-sensitive pricing (Sarkar, 1997), however, any Internet connection may lose its integrity if most important nodes are destroyed (Tu, 2000). In order to fully understand the Internet bandwidth requirement for the Internet bandwidth demand services and applications of an organization, this research uses this construct of Internet bandwidth requirement as the barrier within the intrinsic requirement, availability, and effective utilization. This can be justified by the work of Lee et al. (2008), which reveals that organizational use of Internet bandwidth is influenced by the Internet policy necessity, market forecasting, policy purpose, budget, and deliverables. In order to measure the influence of learning and organizational performance on the Internet bandwidth requirement, the following hypotheses are proposed:

H2a: Internet Bandwidth Requirement is positively related to the financial performance of an organization.
H2b: Internet Bandwidth Requirement is positively related to the non-financial performance of an organization.
H2c: Internet Bandwidth Priority is positively related to the financial performance of an organization.
H2d: Internet Bandwidth Priority is positively related to the non-financial performance of an organization.

Effective Utilization of Organizational Internet Bandwidth

The effective utilization of the organizational Internet bandwidth in the context of this study consists of a multi-dimensional construct with the following multiple indicators: “Organizational Internet Bandwidth Requirement”, “Organizational Internet Bandwidth use”, and “Organizational Internet Bandwidth priority”. The reason for this combination is that “effective utilization” is conceptualized as the tradeoff among “requirement”, “use”, and “priority”. Any organization can only use the internet bandwidth it has access to which either meet its requirements or not. However, the use of the Internet bandwidth is directly related to the services the organization has identified as its priority. Given the fact that there is an immense demand of Internet bandwidth on a global scale, the problem of congestion can never be avoided. How-

ever, deregulation and prudent usage of the web point might be the way forward (Butler, 1996; Mahato et al., 2021). It means an organization not only uses the Internet bandwidth that matters, but uses it effectively by prioritizing certain services for Internet bandwidth as part of its effective utilization strategy. Another crucial aspect of Internet bandwidth usage are the problems that may arise, such as user awareness of the problems associated with the use of the Internet and how the Internet usage may impact the performance of an organization (Hassan et al., 2021; Bindhorob et al., 2021). In terms of the problems commonly associated with the Internet usage, Davis et al. (2002) identify the four social dimensions of diminished impulse control, loneliness or depression, social comfort, and distraction. These problems can be either prevented or solved through learning and the organization's flexibility in using the services and applications which require Internet bandwidth. Various studies on Internet bandwidth usage have discussed the most likely occurring problems and proposed the steps to be used in achieving a successful implementation (Chen et al., 2017; Zheng et al., 2016; Lenhart et al., 2010; Pathak et al., 2021). In order to build on the aforementioned studies, the following hypothesis is formulated:

H4: Effective Utilization of Organizational Internet Bandwidth is positively related to the organizational performance.

Dependent Variable

Organizational Performance

Organizational performance is measurable. In this research, the measure is through the impact of learning and effective utilization of Internet bandwidth. Therefore, it constitutes the dependent variable of this research. The key indicator of organizational performance centers on the financial (monetary unit) and non-financial (non-monetary unit) nature of the organizational output. The same variables are used in Mejia et al. (2010) and Salim and Sulaiman (2011) and serve to express the effects on controlling variables to them. These studies consider the financial measures as the return on assets (ROA), sales growth, and profitability whereas as non-financial measures are considered employee satisfaction, customer growth, and quality in products and services. This study adopts the same variables in order to determine the impact of learning of Internet bandwidth demand services and applications on organizational performance and its relationship with the effective utilization of Internet bandwidth. No statistically significant effect of broadband has been found on the performance of firms (De Stefano et al., 2014). This research intends to explore the impact of the two independent variables on the organizational performance. Hence, the following hypotheses are formulated:

H3: Organizational learning of Internet bandwidth demand services and applications is positively related to the organization performance.

Research Methodology

This study applies a quantitative research methodology where hypothesis testing research is intended to generalize the outcome of the study. Three main constructs were used in order to investigate the relationships among them. Statistic evaluation was used in order for the research to produce a statistically valid quantitative result. Reasonable samples where obtained, and the details on the data collections were given in the subsequent sections. Two statistical application packages; SPSS and Structural Equation Modelling (SEM) with AMOS were utilized to analyze the data particularly in testing the relationships among study variables.

Sampling and Data Collection

The population of interest in this study was defined as Malaysian organizations that utilized Internet bandwidth demand services and applications in their day-to-day activities. The sample for the study was drawn from the available population of individuals working in organizations that use Internet bandwidth. A simple random sampling was selected in order to ensure equal opportunity for all the employees using Internet bandwidth who participated. Thus, the respondents were selected randomly, and their responses were collected for data analysis. The instrument for the data collections consisted of a questionnaire. The items were designed based on the conceptualization for each construct. The questions were modified from previous related research to suit the present study. The questionnaire was designed using the Likert scale type with responses ranging from (0) to (4) (see Appendix 1). The targeted number of 350 to 500 responses was gathered randomly within metropolitan Kuala Lumpur and in other parts of Malaysia. The data collection was performed online and face-to-face, and a total of 318 responses were gathered.

Preliminary Analysis

This dataset consisted of 318 cases (n = 318), and no missing data were found. Exploratory Data Analysis (EDA) was performed at this stage, and the result showed that the dataset met the assumptions of normality and linearity. No violation was observed. Prior to testing the structural model of Internet Bandwidth Utilization, the measurement model and reliability analysis for each construct (organisational performance, organisational learning and utilisation of internet bandwidth) were evaluated using confirmatory factor analysis (CFA). The obtained result showed adequate fit for each measurement model. However, for the Utilisation of Internet Bandwidth construct, two of its dimensions (IBR and IBP) were merged as suggested by the CFA results. The reliability coefficients for each factor or construct are presented in Table 1. All Cronbach's alpha coefficients were satisfactory (Cronbach's $\alpha > .70$) as the values ranged from .738 to .909 for each subscale, thus indicating that the measured items were good and internally consistent (Field, 2009; Pallant, 2007).

Table 1. Descriptive statistics and reliability analysis of the study variables

Constructs	Factors	No. of items	Cronbach's alpha
Organisational performance	NFP	3	.769
	FPP	2	.831
Organisational learning	CLL	2	.860
	SVV	2	.909
	OMM	2	.841
	IKS	2	.738
Utilisation of Internet bandwidth	IBR and IBP	5	.857
	IBS	3	.899

4 Results

The information security perspective developed in this article reported issues involving corporate information sources, the needs of information users for corporate users, and the corporate guidelines that permeate the entire life of the organization. The variables involved in creating a safe behaviour for the information user as well as information security from the point of view of human resource management were briefly described. Thus, it was concluded that the importance of education and organizational learning in information security issues is fundamental. While many information security initiatives are driven by information technology departments, the real reasons for the failures continue to pervade the entire organization. People are present everywhere, whether as users or as developers of information systems, and it is up to them to watch out for organizational policies and guidelines designed to maintain security. It is up to the organization and its management body to make such policies and guidelines known and to value their adoption.

Such dissemination occurs within and outside the organization, as other business partner companies and their employees have access to confidential information from third parties. It was concluded that the "people" element is a critical variable in information security management in organizations. Information policies should be accessible to employees and enforceable. Regarding technology, investment continuity is valid, but it must be balanced with the development of informal controls (involving people) and formal controls (involving policies and processes) for effective and effective information security management.

5 Presentation of Results and Discussion

The Structural Model of Internet Bandwidth Utilization

Figure 1 below illustrates the hypothesized model of the mediating role of Internet Bandwidth Utilization influencing the organizational performance. This model con-

sisted of organisational learning, utilization of Internet bandwidth and organisational performance of the Malaysian organizations. Organisational learning was an exogenous variable and consisted of four dimensions. The dimensions of organisational learning were commitment to learning (CLL), shared vision (SVV), open-mindedness (OMM), and intra-organizational knowledge sharing (IKS). Utilization of Internet Bandwidth functioned as a mediator and was made up of two dimensions, internet bandwidth requirement and priority (IBR and IBP) and internet bandwidth problem resolution (IBS). The organizational performance served as an outcome variable and consisted of two dimensions, non-financial performance (NFP) and financial performance (FPP). This model was analyzed through Structural Equation Modelling (AMOS) with Maximum Likelihood Estimation (MLE). The goodness-of-fit (GOF) indices results indicated that the hypothesized model was adequate to represent the data; χ^2 (18) = 71.33, p = .000, χ^2/df = 3.963, CFI = .973 and RMSEA = .097. Furthermore, its normed chi-square (< 5.0) and CFI (≥ .95) suggested that the model showed a good model fit (Bentler, 1990; Hair et al., 2010; Tabachnick and Fidell, 2007). The RMSEA value of .097 indicated a mediocre fit (RMSEA = .08 to .10) (MacCallum, Browne and Sugawara, 1996). These statistics suggested that the hypothesized model of Internet Bandwidth Utilization was consistent with the data. Thus, there was evidence to support the validity of the inter-relationship of organizational learning, Internet bandwidth utilization and organisational performance. The result for the Internet Bandwidth Utilization structural model and its parameter estimates is provided in Figure 2.

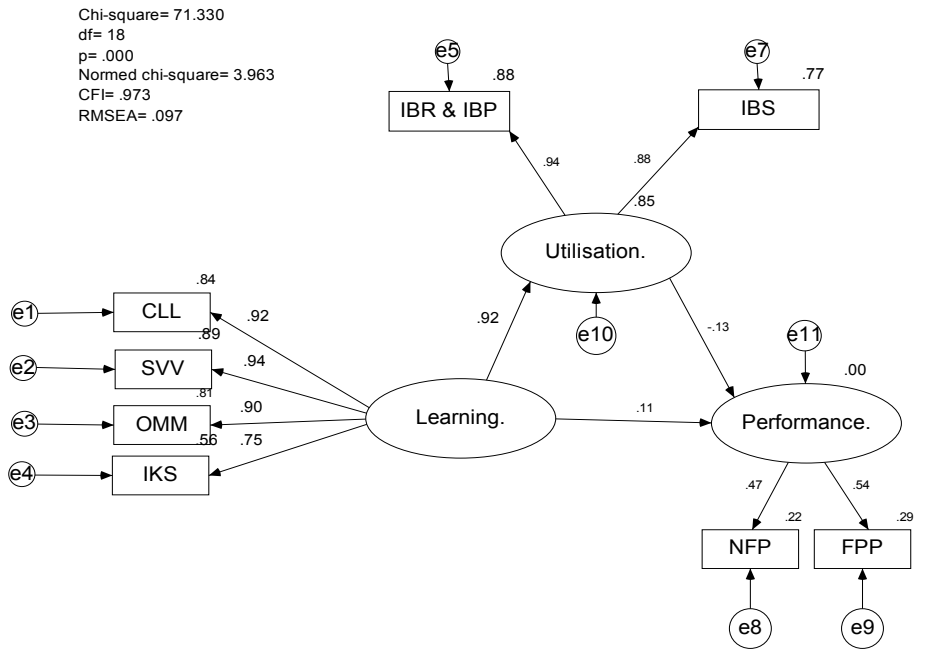

Fig 2. The standardized coefficient results for the hypothesized structural model on Internet bandwidth utilization

The relationship between Organizational Learning and Effective Internet Bandwidth Utilization

The result indicated that there was a significant positive relationship between organizational learning and effective Internet bandwidth utilization, the degree of relationship being strong (path coefficient = .92, CR > ±1.96). Hence, organizational learning had a significant direct impact in enhancing effective Internet bandwidth utilization. Further investigation into the relationship between each indicator of organizational learning (commitment to learning, shared vision, openness and intra-organizational knowledge sharing) and Internet bandwidth utilization was examined. The result suggested that there was a significant positive relationship between each of the organizational learning dimensions and Internet bandwidth utilization. It was found that the main contributor for Internet bandwidth utilization was shared vision (regression weight = .342, CR > ±1.96), followed by intra-organizational knowledge sharing (regression weight = .284, CR > ±1.96), commitment to learning (regression weight = .172, CR > ±1.96), and openness (regression weight = .159, CR > ±1.96). Table 2 below summarizes the result of the relationship between these dimensions and Internet bandwidth utilization. Therefore, H_1 was supported. All the four sub-hypotheses ($H_{1a,}$ $H_{1b,}$ H_{1c} and H_{1d}) were also supported.

Table 2. Results of the relationship between effective Internet bandwidth utilization and its predictors

Relationship	Regression weight
Commitment to learning ---> Utilization of Internet Bandwidth	.172*
Shared vision ---> Utilization of Internet Bandwidth	.342*
Openness ---> Utilization of Internet Bandwidth	.159*
Intra-organizational knowledge sharing ---> Utilization of Internet Bandwidth	.284*

* The relationship was significant at .05 alpha level.

The relationship between Effective Internet Bandwidth Utilization and Organizational Performance

There was no significant relationship between Internet bandwidth utilization and the organizational performance (path coefficient = -.13, CR < ±1.96). The relationship between each factor of Internet bandwidth utilization was also investigated. The findings revealed that there were no significant relationships between each of the predictors and the Internet bandwidth utilization. The relationship between Internet bandwidth requirement and priority and Internet bandwidth utilization was positive and non-significant (regression weight =.10, CR < ±1.96). The relationship between internet bandwidth problem resolution and Internet bandwidth utilization was also non-significant (regression weight = -.11, CR < ±1.96). Thus, the Internet bandwidth utilization had no significant direct impact on the organizational performance and therefore, H_2 was not supported. $H_{2a,}$ $H_{2b,}$ and H_{2c} were also not supported. Table 3 below

summarizes the results of the relationship between these factors and the performance of organizations.

Table 3. Results on the relationship between organizational performance and its predictors

Relationship	Regression weight
Internet bandwidth requirement and priority ---> organizational performance	.104
Internet bandwidth problem resolution ---> organizational performance	-.106

The relationship between Organizational Learning and Organizational Performance

For the relationship between organizational learning and organizational performance, the findings revealed that there was a positive relationship between these two variables, however, the relationship was not significant (path coefficient = .11, CR < ±1.96). Hence, organizational learning had no significant direct impact in enhancing the organizational performance. H_3 was not supported. Further investigation on the relationship between each indicator of organizational learning (commitment to learning, shared vision, openness and intra-organizational knowledge sharing) and organizational performance was scrutinized. The result revealed that there was no significant relationship between each of the organizational learning's dimensions and organizational performance. The path coefficient between commitment to learning and organizational performance was not significant (regression weight = .076, CR < ±1.96). There were also no significant relationships between shared vision and organizational performance (regression weight = .076, CR < ±1.96), openness and organizational performance (regression weight = .076, CR < ±1.96), also between intra-organizational knowledge sharing and organizational performance (regression weight = .076, CR < ±1.96). Therefore, $H_{3a,}$ $H_{3b,}$ H_{3c} and $H_{3d,}$ were also not supported. See Table 4 for the standardized coefficient result of the relationship between these organizational learning factors and the performance of the organizations.

Table 4. Result of the relationship between organizational performance and its predictors

Relationship	Regression weight
Commitment to learning ---> organizational performance	.076
Shared vision ---> organizational performance	.064
Openness ---> organizational performance	-.227
Intra-organizational knowledge sharing ---> organizational performance	.114

The relationship between Organizational Learning and Organizational Performance is mediated by Effective utilization of Internet Bandwidth

Figure 2 showed that both organizational learning (path coefficient = .11, CR < ±1.96) and Internet bandwidth utilization (path coefficient = -.13, CR < ±1.96) had no significant relationship with organizational performance. Since there were no significant relationships between these predictors and organizational performance, Internet bandwidth utilization was not a significant mediator to organizational performance.

6 Discussion and Implications

This study presents a framework for studying organizational Internet bandwidth demand services and applications, organizational learning orientation, and organizational performance. The model was tested using data collected from selected Malaysian business firms. It was found that the data adequately represent the hypothesized model by GOF indices, model fit and mediocre fit at RMSEA respectively (χ^2 (18) = 71.33, p = .000, χ^2/df = 3.963, CFI = .973 and RMSEA = .097, normed chi-square (< 5.0), CFI (≥ .95), RMSEA = (.097). Further analysis indicates that the results support the majority of the hypotheses and reveal that organizational learning is critical in the effective utilization of Internet bandwidth. Hence, a significant inference can be drawn from these findings. Researchers and stakeholders are advised to follow certain guidelines on the utilization of internet bandwidth as the the relationship between organizational learning and effective Internet bandwidth utilization is strong, significant and positive (path coefficient = .92, CR > ±1.96).

Thus, an organization that is committed to learning will benefit from a full understanding of its Internet bandwidth requirement and priority on Internet bandwidth demand services and applications. Furthermore, the findings also suggest that "shared vision" is the main contributor to the effective utilization of Internet bandwidth (regression weight = .342, CR > ±1.96), whereas openness is the least (regression weight = .159, CR > ±1.96), Therefore a positive shared vision environment is beneficial for any organization that wishes to stand out by effectively utilizing its Internet bandwidth. This is very crucial for an organization as it encourages its employees to adopt a shared vision of its online usage and any related tasks that require Internet bandwidth. The analysis was aimed at investigating whether or not the effective utilization of Internet bandwidth can lead to an increase in organizational performance and was found to be negative. There was no significant relationship between the effective utilization of Internet bandwidth and the performance of organizations (path coefficient = -.13, CR < ±1.96). In all cases this result was confirmed by the relationships between each factors of effective utilization of Internet bandwidth and organizational performance. Although the relationship between organizational learning of effective utilization of Internet bandwidth and organizational performance were positive, it was not significant (path coefficient = .11, CR < ±1.96). Hence, learning of effective utilization of Internet bandwidth has no significant direct impact on enhancing organizational performance. Finally, it can be concluded from this study that the effective utilization of Internet bandwidth is not a significant mediator to organizational performance.

This empirical analysis did not reveal a mediating effect of effective utilization of bandwidth on the relationship between organizational learning and organizational performance. A good indication may be that learning of the use of Internet bandwidth impacts the individual use which leads to better decisions on the Internet bandwidth demand services and applications of an organization, yet it does not yield significant operational performance (non-financial) and financial performance. Crucial here is the fact that organizational learning has a positive impact on organizational commitment (Salarian et al., 2015). Thus, this study reveals that working with Internet bandwidth demand services and applications requires learning and does not necessarily improve organizational performance. The effective utilization of Internet bandwidth should have been tested as moderating the relationships between organizational and organizational performance which is not considered in this research. Future research should explore other dimensions and possibly consider the effective utilization of Internet bandwidth in respect to a moderating variable.

7 Limitations and Recommendations

This research focuses on the use of Internet bandwidth and emphasizes on the importance of learning Internet bandwidth demand service and application used by organizations and links it organizational performance. However, it does not address the issue of various Internet bandwidth demand services and applications for organizations. Future research could identify the categories of Internet bandwidth demand services and applications for organizations and also investigate if an organization relies totally on cloud based services or not as cloud services may support organizational learning. Furthermore, this study is limited to the effect of learning within the domain of the use of Internet bandwidth for work-related activities by individuals working in business companies. However, there are numerous other concerns of the employees using their organization's Internet bandwidth for non-work related issues and in some case abusing it. Hence, future research should consider categorizing the use of Internet bandwidth for work and non-work related tasks. Cross-national studies covering different locations around the world other than Malaysia should also be conducted. This will validate the strength of the proposed framework and the differences of the findings. Hence, comparability can be established in generalizing the outcome of this kind of work across varying business systems and organizational forms.

References

Abdullah., & Ramay, I. M. (2012). Antecedents of organizational commitment of banking sector employees in Pakistan. Serbian Journal of Management, 7(1), 89-102.

Abel, E.E. and Abd Latiff, M.S., 2021. The utilization of algorithms for cloud internet of things application domains: a review. Frontiers of Computer Science, 15(3), pp.1-27.

Agneessens, F., & Wittek, R. (2012). Where do intra-organizational advice relations come from? The role of informal status and social capital in social exchange. Social Networks, 34(3), 333-345.

Akgun, A., Keskin, H., Byrne, J., & Aren, S. (2007). Emotional and learning capability and their impact on product innovativeness and firm performance. Technovation, 27(9), 501-513.

Amrutha, V.N. and Geetha, S.N., 2021. Linking organizational green training and voluntary workplace green behavior: Mediating role of green supporting climate and employees' green satisfaction. Journal of Cleaner Production, 290, p.125876.

Argyris, C., & Schön, D. A. (1996). Organizational Learning II: Theory. Method and Practice.

Barak, M., & Levenberg, A. (2016). Flexible thinking in learning: An individual differences measure for learning in technology-enhanced environments. Computers & Education, 99, 39-52.

Barney, J.B. (2002). Gaining and Sustaining Competitive Advantage (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Billon, M., Crespo, J. and Lera-Lopez, F., 2021. Do educational inequalities affect Internet use? An analysis for developed and developing countries. Telematics and Informatics, 58, p.101521.

Bindhorob, M.H. and Aljaaidi, K.S., 2021. The Impact of Mobile Technologies' Competency on Utilization: Empirical Evidence. Turkish Journal of Computer and Mathematics Education (TURCOMAT), 12(6), pp.3688-3708.

Booty, W. M. (1975). A theory of resource utilization

Boud, D., Keogh, R., & Walker, D. (2013). Reflection: Turning experience into learning. Routledge.

Burhan Ismael, N., Jabbar Othman, B., Gardi, B., Abdalla Hamza, P., Sorguli, S., Mahmood Aziz, H., Ali Ahmed, S., Sabir, B.Y., Ali, B.J. and Anwar, G., 2021. The Role of Training and Development on Organizational effectiveness. Ismael, NB, Othman, BJ, Gardi, B., Hamza, PA, Sorguli, S., Aziz, HM, Ahmed, SA, Sabir, BY, Ali, BJ, Anwar, G.(2021). The Role of Training and Development on Organizational effectiveness. International Journal of Engineering, Business and Management, 5(3), pp.15-24.

Butler, D. (1996). Research and the Internet connection. Nature, 380(6573), 377-381.

Calantone, R. J., Cavusgil, S. T., & Zhao, Y. (2002). Learning orientation, firm innovation capacity, and firm performance. Industrial Marketing Management, 31(6), 515-524.

Campbell, J. P., McCloy, R. A., Oppler, S. H., & Sager, C. E. (1993). A theory of performance. In E. Schmitt, W. C. Borman, & Associates (Eds.), Personnel selection in organizations (pp. 35–70). San Francisco: Jossey-Bass

Chen, H., Beaudoin, C. E., & Hong, T. (2017). Securing Online Privacy: An Empirical Test on Internet Scam Victimization, Online Privacy Concerns, and Privacy Protection Behaviors. Computers in Human Behavior.

Combs, J. G., Crook, T. R., & Shook, C. L. (2005). The dimensionality of organizational performance and its implications for strategic management research. In D. J. Ketchen (Ed.), Research methodology in strategy and management (Vol. 2, pp. 259-286). Amsterdam: Elsevier.

Daase, B., Bollmeier, L.J., Benson, L. and Rabl, T., 2021, June. Maximizing persistent memory bandwidth utilization for OLAP workloads. In Proceedings of the 2021 International Conference on Management of Data (pp. 339-351).

Danish, R. Q., Ramzan, S., & Ahmad, F. (2013). Effect of perceived organizational support and work environment on organizational commitment: Mediating role of self-monitoring. Advances in Economics and Business, 1(4), 312-317.

Davis, R. A., Flett, G. L., & Besser, A. (2002). Validation of a new scale for measuring problematic Internet use: Implications for pre-employment screening. CyberPsychology & Behavior, 5(4), 331-345.

Dhinnesh, A.N. and Sabapathi, T., 2021. Probabilistic neural network based efficient bandwidth allocation in wireless sensor networks. Journal of Ambient Intelligence and Humanized Computing, pp.1-12.

Edmondson, A., & Moingeon, B. (1998). From organizational learning to learning organization. Management Learning, 29(1), 5-20.

Expósito-Langa, M., Molina-Morales, F. X., & Tomás-Miquel, J. V. (2015). How shared vision moderates the effects of absorptive capacity and networking on clustered firms' innovation. Scandinavian Journal of Management, 31(3), 293-302.

Field, A. (2009). Discovering statistics using SPSS. Sage publications.

G.R. Jones. Organizational theory, design, and change (5th ed.). Upper Saddle River, NJ: Pearson Prentice Hall, 2007.

Gagné, M. (2009). A model of knowledge-sharing motivation. Human Resource Management, 48(4), 571.

Ganapathy, A., 2021. Edge Computing: Utilization of the Internet of Things for Time-Sensitive Data Processing. Asian Business Review, 11(2), pp.59-66.

García-Morales, V. J., Jiménez-Barrionuevo, M. M., & Gutiérrez-Gutiérrez, L. (2012). Transformational leadership influence on organizational performance through organizational learning and innovation. Journal of Business Research, 65(7), 1040-1050.

Gunday, G., Ulusoy, G., Kilic, K., & Alpkan, L. (2011). Effects of innovation types on firm performance. International Journal of production economics, 133(2), 662-676.

Hamann, P. M., Schiemann, F., Bellora, L., & Guenther, T. W. (2013). Exploring the dimensions of organizational performance, a construct validity study. Organizational Research Methods, 16(1), 67-87.

Hanaysha, J. (2016). Testing the Effects of Employee Engagement, Work Environment, and Organizational Learning on Organizational Commitment. Procedia-Social and Behavioral Sciences, 229, 289-297.

Hassan, M.K., Ariffin, S.H., Syed-Yusof, S.K., Ghazali, N.E. and Kanona, M.E., 2021. Analysis of hybrid non-linear autoregressive neural network and local smoothing technique for bandwidth slice forecast. Telkomnika, 19(4), pp.1078-1089.

Hilbert, M. (2016). The bad news is that the digital access divide is here to stay: Domestically installed bandwidths among 172 countries for 1986–2014. Telecommunications Policy, 40(6), 567-581.

Hill, R. (2014). The Internet, its governance, and the multi-stakeholder model. Info, 16(2), 16-46.

Hult GTM, Ferrell OC. A global learning organization structure and market information processing. J Bus Res 1997;40(2):155– 66.

Hult GTM. Managing the international strategic sourcing process as a market-driven organizational learning system. Decis Sci 1998;29(1): 193– 216.

Hurley RF, Hult GTM. Innovation, market orientation, and organizational learning: an integration and empirical examination. J Mark 1998; 62:42– 54.

Idika, E.O., Eneogu, N.D., Ede Maxwell, O., Obiorah Ngozika, J., Nji, I.A. and Okolie Ogechukwu M, T.B., 2021. Availability and Utilization of Digital Technologies in the Teaching and Learning of Economics at the University of Nigeria, Nsukka. Journal of Critical Reviews, 8(2), pp.494-502.

J. E. Lawrence. The challenges and utilization of e-commerce: use of internet by small to medium-sized enterprises in the United Kingdom. Information, society and justice journal, 1(2), 99-113, 2008

J. Roughton, & N. Crutchfield, Job hazard analysis: A guide for voluntary compliance and beyond. Butterworth-Heinemann, 2011.

J.M. Stanton, Company profile of the frequent Internet user, Communications of the ACM 45, 2002, pp. 55–59.

Jiménez-Jiménez, D., & Sanz-Valle, R. (2011). Innovation, organizational learning, and performance. Journal of Business Research, 64(4), 408–417.

Kaso, N., Mariani, M., Ilham, D., Firman, F., Aswar, N. and Iksan, M., 2021. The Principal's Leadership: How to Improve the Quality of Teaching and Learning Process in State Junior High School of Luwu. Jurnal Ad'ministrare, 8(1), pp.49-58.

Koponen, I. T., Kokkonen, T., & Nousiainen, M. (2016). Modelling sociocognitive aspects of students' learning. Physica A: Statistical Mechanics and its Applications.

Lee, J., Kang, S. M., Lee, Y. R., & Lee, J. (2008). A Study on the Future Internet Requirement and Strategy in Korea. In Advanced Communication Technology, 2008. ICACT 2008. 10th International Conference on (Vol. 1, pp. 627-629). IEEE.

Lee, S., & Lee, C. (2015). Creative interaction and multiplexity in intraorganizational networks. Management Communication Quarterly, 29(1), 56-83.

Lenhart, A., Purcell, K., Smith, A., & Zickuhr, K. (2010). Social Media & Mobile Internet Use among Teens and Young Adults. Millennials. Pew internet & American life project.

Loebbecke, C., van Fenema, P. C., & Powell, P. (2016). Managing inter-organizational knowledge sharing. The Journal of Strategic Information Systems, 25(1), 4-14.

M. W. Peng and Y. Luo, "Managerial ties and firm performance in a transition economy: The nature of a micro-macro link," Acad. Manage. J., vol. 43, no. 3, pp. 486–501, 2000.

Mahato, B., Roy, D.G. and De, D., 2021. Distributed bandwidth selection approach for cooperative peer to peer multi-cloud platform. Peer-to-Peer Networking and Applications, 14(1), pp.177-201.

Maheshvarananda, D., & Branch, M. (2010). The Progressive Utilization Theory (Prout): Alternative Economic and Spiritual Model for the Welfare of All. Working USA, 13(1), 31-40.

Mejia, L. R., Berrone, P., & Santos, M. (2010). Compensation and organizational performance: theory, research, and practice. Armonk, N.Y.: M.E. Sharpe.

Mitchell, C. and Larry, S., 2021. Learning about organizational learning. In Organizational learning in schools (pp. 177-199). Taylor & Francis.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. Organization Science, 5(1), 14-37.

Pallant, J. (2007). SPSS survival manual, 3rd. Edition. McGrath Hill.

Patel, K. and Rathod, J.M., 2016. Effective Utilization of Bandwidth for Mobile Ad Hoc Network. Indian Journal of Science and Technology, 9(27).

Pathak, S.K., Batham, D. and Prakash, S., 2021. Time and bandwidth aware traffic balancing in elastic optical networks–A two dimensional approach. Optical Fiber Technology, 64, p.102585.

Pawlowsky, P. (2001). The treatment of organizational learning in management science. In M. Dierkes, A. Berthion Antal, J. Child & I. Nonaka (eds.), Handbook of Organizational Learning & Knowledge (pp.61-88). Oxford: Oxford University Press

Penrose, E. T. (1995). The theory of the growth of the firm (3rd ed.). Oxford: Oxford University Press.

Porter, M. E. (1980). Competitive Strategy. New York: Free Press

Ray, G., Barney, J. B., & Muhanna, W. A. (2004). Capabilities, business processes, and competitive advantage: Choosing the dependent variable in empirical tests of the resource-based view. Strategic Management Journal, 25(1), 23–37.

Riggs, W. (2010). Open-Mindedness. Metaphilosophy, 41(1-2), 172-188.

S.J. Savage, & D.M. Waldman. Ability, location and household demand for Internet bandwidth. International Journal of Industrial Organization, 27(2), 166-174, 2009

Saadat, V., & Saadat, Z. (2016). Organizational Learning as a Key Role of Organizational Success. Procedia-Social and Behavioral Sciences, 230, 219-225.

Salarian, M., Baharmpour, K., & Habibi, S. (2015). Organizational commitment and its relationship with organizational learning (case study: general directorate of ports and maritime of Mazandaran province). International Journal of Life Science, 5(6), 67-73.

Salim, I. M., & Sulaiman, M. (2011). Organizational learning, innovation and performance: a study of Malaysian small and medium sized enterprises. International Journal of Business and Management, 6(12), 118.

Santori, C., Keith, R.J., Whittington, C.M., Thompson, M.B., Van Dyke, J.U. and Spencer, R.J., 2021. Changes in participant behaviour and attitudes are associated with knowledge and skills gained by using a turtle conservation citizen science app. People and Nature, 3(1), pp.66-76.

Sarkar, M. (1997). Internet pricing: A regulatory imperative. Internet economics, 479-500.

Sasikala, S. and Sakthivel, S., 2021. Adaption of 5G networks in industrial sector with improved bandwidth utilization. Journal of Ambient Intelligence and Humanized Computing, 12(6), pp.6433-6444.

Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources, and their relationship with burnout and engagement: A multi-sample study. Journal of organizational Behavior, 25(3), 293-315.

Shrivastava, P. (1983). A Typology of Organizational Learning Systems. Journal of Management Studies 20(1), 7–28.

Silva, S. A., Carvalho, H., Oliveira, M. J., Fialho, T., Soares, C. G., & Jacinto, C. (2017). Organizational practices for learning with work accidents throughout their information cycle. Safety Science.

Spiro, R. J., Collins, B. P., & Ramchandran, A. R. (2007). Modes of openness and flexibility in cognitive flexibility hypertext learning environments. In B. Khan (Ed.), Flexible learning in an information society (pp. 18e25). Hershey, PA: Information Science Publishing.

T. De Stefano, R. Kneller, & J. Timmis, The (Fuzzy) Digital Divide: The Effect of Broadband Internet Use on UK Firm Performance. University of Nottingham Discussion Papers in Economics, 2014, (14/06).

Ussahawanitchakit, P. (2008). Impacts of Organizational Learning on Innovation Orientation and Firm Efficiency: An Empirical Assessment of Accounting Firms in Thailand. Journal of Business, 8(4), 81-95.

Wernerfelt, B. (1984). A resource-based view of the firm. Strategic Management Journal, 5(2), 171-180.

West, G. B., & Bocârnea, M. (2008). Servant leadership and organizational outcomes: relationships in United States and Filipino Higher Educational settings. Servant Leadership Roundtable at Regent University, Virginia Beach, VA.

Zhang, S., Lei, W., Zhang, W. and Li, H., 2021. An evaluation of bottleneck bandwidth and round trip time and its variants. International Journal of Communication Systems, 34(9), p.e4772.

Zheng, Y., Wei, D., Li, J., Zhu, T., & Ning, H. (2016). Internet use and its impact on individual physical health. IEEE Access, 4, 5135-514