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The Influential Factors of Work Productivity During Covid-19: The Effect of Digital Skill, Collaboration and Organizational Support

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Abstract. For controlling the negative impact of Covid-19 outbreak, the Indonesia government instructs the citizen to work from home (WFH). Unfortunately, the WFH productivity is still questioned. This study is an attempt to elaborate work productivity and the effect of digital skill as individual driver, digital collaboration as group driver, and perceived organizational support or POS as organizational driver. For supporting the arguments, this article has conducted a quantitative study which involved 824 working citizens as the respondents from all over Indonesia. The respondents are mostly the first timers of working from home. They were working for governmental institution or business organizations from various industries in Indonesia. Collected data was structured and calculated by PLS structural equation modelling) and SmartPLS application version 3. This study concludes that digital skill and POS affect directly on work productivity, but digital collaboration impacts indirectly. Digital skill becomes a mediator in linkage between digital collaboration and work productivity.

Keywords: *collaboration; digital skill; perceived organizational support; work productivity*

1 Introduction

In the interconnecting world, the multiplier effect of morbidity and mortality from a disease has become threatening since the pandemics (McKibbin & Fernando, 2020). The Covid-19 pandemics impacts obviously on slowing down economic growth. The economic indicators are dropping down significantly. It depends on how population proportion that get sick, how the fatality rate is, and how many people do not go to the office for avoiding the disease (Wren-Lewis, 2020). Covid-19 pandemic has changed many aspects of human civilization fundamentally. It forces the workplace migration from work centrally at office into remotely at homes. Working from home was stimulated by fast growth of Covid-29 victims and supposed to be an effective way to flatten the curve of

victims. The Indonesia government instructed all working citizen to do work from home during the pandemics.

It is only about 37 percent jobs may be conducted totally from home in the United States (Dingel & Neilman, 2020). The immediate instruction for working at home makes employee productivity, business survivability, and growth of national economic dropped. The proportion of jobs that could be performed from home is a crucial input for appraising the economic performance during this period of social distancing. Employee productivity may differ individually and considerably when working from home rather than working from usual workplace (Dingel & Neilman, 2020). Based on this point of views, work from home productivity becomes an important issue in perspectives of micro and macroeconomic.

When it is compared to conversional work arrangement, work from home was projected to earn many advantages (e.g., had fewer sick days, took less time off, took shorter breaks. reduced less carbon emissions) and overcoming many barriers such as gender, skill level, income levels, job position, and space (Bakker, Du, & Derks, 2019). The empirical study revealed that the higher the skill level and the bigger proportion of professional or managerial staff in the workplace, the more likely is option of work from home to be offered as fixed employment choice (Felstead, Jewson, Phizacklea, & Walter, 2002). The increase of work productivity is caused by having a personal environment, which makes employee more comfortable to accomplish the works. Offices becomes distracting places for working. The productivity of work from home is caused by the fact that the people at home worked in the longer hours than at office (Bloom, 2014).

As an alternative working arrangement, the productivity of work from home is still doubted by the organizations, especially for them which run work from home massively at the first time. Many studies have clarified that work from home provide benefits for organization and workers. Unfortunately for the organizations, it is difficult to comply with. They need to portrait work from home productivity and to scrutinize impact of the influential drivers. Many studies also explained that there are many influential drivers impact on the productivity of work from home. Work hour is an influential driver. Doing work from home which is fewer than 18 hours per week has a higher positive impact on productivity than fulltime (Kazekami, 2018). trust and The trust and support from the supervisor, reduced communication with co-workers, the availability of the working facility at home, possibility to take care of family were identified as the influential driver for work from home productivity (Nakrošienė, Bučiūnienė, , & Goštautaitė, 2019).

This study applied organizational behavior theory (Uhl-Bien, Picolo, & Schermerhorn Jr., 2020) as guiding principle. Work productivity is viewed as behavior in organization. As a behavior, Work productivity is derived by individual, group, and organizational factors. This study determines that digital skill as personal driver of work productivity which emerge from the internal of people itself. Digital collaboration as group driver of work productivity which derived from people directly interact in daily organizational activity. Finally, perceived organizational support was determined as organizational driver which happened and provides by the organization. According to all previous explanation, this study attempts to elaborate the work productivity and to scrutinize its influential drivers. Are digital skill, digital collaboration, and perceived organizational support as influential factors for work productivity during COVID-19 pandemic.

2 Literature Review

2.1 Work Productivity

Since 1990's, work from home was already known as telecommuting, telework, virtual or remote working which is defined as a flexible work arrangement that allows people to work flexibly from any location rather than from office traditionally in regular or temporary basis (Maruyama, Hopkinson, & James, 2009). Work from home as an alternative work arrangement is used for improving social inclusion by enabling individuals with specific constraints for contributing to the workforce (Bosua, Kurnia, & Moza, 2017). Related to the case of Covid-19, Work from home is viewed as an alternative which provides opportunities for protecting people for being infected by diseases in the public places. In Indonesia, work from home is conducted on temporary base at the beginning.

The number of studies indicate that work from home provides temporal-spatial flexibility (Baruch, 2000), enhances work-life balance while it also reduces traffic congestion (Marumaya & Tietze, 2012), lowering stress level and infrastructure costs, and improves productivity (Troup & Rose, 2012). The study from eleven Malaysian oil and gas companies had revealed that WFH impacts on work-family balance, job autonomy, occupational level, and work productivity (Khan, Mohammed, & Harith, 2018).

The other study revealed that work from home has a weak but positive relationship with better work quality. It means that there are other influential factors of work quality rather than work from home (Onyemaechi, Chinyere, & Emmanuel, 2018). This article defines the work productivity as personal achievement of a working during pandemic which is compared with work-from-

office arrangement. This article used self-reported productivity. Based on worker's perception whether she or he achieved better outcome objectively (faster, more quantity, and more accurate) and subjectively (happier, more focused, more creative). It is adapted from "how effective is telecommuting" (Allen, Golden, & Shockley, 2015).

2.2 Digital Skill

Based on organizational behavior (Uhl-Bien, Picolo, & Schermerhorn Jr., 2020), ability or skill or competence is one of important factor which influence the work productivity. In work from home context, digital skill is needed. Previous study shows that the higher digital skill will generate performance more effectively and efficiently. Digital skills are relevant not only for workers in high tech or ICT industries, but to all traditional industries too. The continuously intensifying digital technology has an impact on productivity in all sectors of the economy (Funes, Aguirre, Deeg, & Hoefnagels, 2018). Digital skill become an imperative for business organization. Increased productivity and revenue growth in compelling business results, are going to be realized by organizations that have adopted digital technology. Companies that are not adopting an integrated approach and training employees with digital skills, are failing to seize a significant opportunities digital workplace could convey (Attaran, Attaran, & Kirkland, 2019).

Digital skills cover all skills related to digital things from the basic digital skill or digital literacy, the general digital skills for the workforce, and the specific digital skills for the ICT professionals. Digital skills needed by the workforce are likely to differ across sectors, there will be some minimum requirements linked to processing information that will be applicable across all sectors (Motyl, Baronio, Uberti, Speranza, & Filippi, 2017). This article adapted concept developed by previous study (Van Deursen, Helsper, & Eynon, 2016) about measuring digital skill. Digital skill covers four dimensions: digital technical, digital communication, digital analytics, and digital mindset. According to OECD Economic Policy Paper (Sorbe, Gal, Nicoletti, & Timiliotis, 2019) digital technology can leverage firm productivity. The gains from digital resources have been concerted among the most industrious firms, which benefit from the organizational and human and capital. Based on that repot, this article tries to formulate hypothesis that digital skill impact on work productivity positively and significantly.

H1: Digital skill has positive impact on work productivity significantly

2.3 Digital Collaboration

Beside individual skill or capability, productivity as behavior is also influenced by social factor. Ability individual to collaborate with others is also essential factor which influenced productivity (Uhl-Bien, Picolo, & Schermerhorn Jr., 2020). Collaboration is a mutual beneficial and well-defined relationship among two or more entities to reach shared goals. It is often used as a vehicle for solving complex issues or problems (Green & Johnson, 2015). In work from home context, collaboration is conducted via internet. This article uses digital collaboration as the construct. Digital collaboration is operationally defined collaboration by using digital technology among workers with internal and/or external partners to accomplish a common task (Kock, 2009). By adapting the pervious concept (Easley, Devaraj, & Crant, 2003), digital collaboration is measured based on four aspects: team characteristics, job type. collaboration quality, and technology usage.

Previous study explains that collaboration influences productivity. In academic research, scientists who had collaboration with industry produced more publications rather than scientists without industrial collaboration. Collaboration made scientists' productivity higher (Bikard, Valiki, & Teodoridis, 2019). In partnership-based supply chain, collaboration impact on commitment, innovation, and performance of the firms (Shin, Park, & Park, 2019). Based on these empirical facts, this article makes hypothesis that:

H2: Digital collaboration has positive impact on work productivity significantly

Several empirical studies have proven that collaboration influence skill development. In education, collaborative learning approach had a positive impact on the students' performance as compared to the conventional learning approach. Ability to learn collaboratively impact on student's ability to solve statistical cases (Allan, 2018). In manufacturing, quality circle programs influence positively on skill improvement. Skills can be improved through planned interventions in collaboration on the job (Kim, Hawley, Cho, Hyun, & Kim, 2016). Relating to these empirical facts, this article tries to arrange hypothesis that digital collaboration has positive impact on digital skill significantly.

H3: Digital collaboration has positive impact on digital skill significantly

Perceived Organizational Support. Beside skill as individual factor and collaboration as group factor, this article views that work productivity is influenced by organizational factors too. Perceived organizational support (POS) is perceived as organizational factor on this study. POS is a generalized employee perception relating the extent to which the organization appreciates employee's

contributions and cares about employee's well-being (Kurtessis, et al., 2017). Employee who believes that organizations treat them fairly and care about their well-being will feel obliged to reciprocate by increased loyalty, commitment, and performance (Eder & Eisenberger, 2008). When organization provides support to employees and value their contributions, employees will respond with positive work-related behaviors (Lyubovnikova, Dawson, & West, 2018) such as increased effort and performance (Kim, Hur, Moon, & Jun, 2017).

At the beginning for measuring POS, the previous research used questionnaire with 32 items but then using only eight items with adequate psychometric properties which respondent is asked to indicate the extent to which she/he agree on a seven-point scale (Eisenberger, Huntington, Hutchison, & Sowa, 1986) This article measure POS in four dimensions: rewards, development, working conditions, and employee welfare. Previous empirical tests have proven that POS and productivity mutually influenced each other. In laundry plants, wellness and post-program health participation impact on productivity improvements based. Perceived organizational support in employee well-being impacts on productivity by about 10% (Gubler, Larkin, & Pierce, 2018). The survey on 88 teams which based in 13 health care organizations across the United Kingdom proved POS impact on individual and team productivity (Lyubovnikova, Dawson, & West, 2018). Relating to the empirical facts, this article will test the hypothesis: POS impacts on work productivity.

H4: Perceived organizational support has positive impact on work productivity significantly

The empirical study on 916 nurses at seven publicly funded medical facilities in Japan concluded that good relationship with their organization is believed is effective for improving clinical competency in nurses with five or more years of experience (Sasaki, Fukada, Okuda, & Fujihara, 2019). The empirical study on 224 teachers from 36 urban elementary schools in USA concluded that "CARE for Teachers' program as POS intervention in educational organization had impacted on teachers' social and emotional competence and the quality of classroom learning (Jennigs, et al., 2017). In Italian, POS influenced self-competence of nurses in two hospitals (Battistelli, Galletta, Vandenberghe, & Odoardi, 2016). Based on those empirical facts, this article proposes a hypothesis to test:

H5: Perceived organizational support has positive impact on digital skill significantly

Empirical study about impact of POS on collaboration is still limited. This article found impact of POS on team effectiveness (Howes, Cropanzano, Grandey, &

Mohler, 2000), knowledge sharing behavior (Le & Lei, 2019), and team learning behavior (Kim M, 2017). Based on the empirical facts, this article makes hypothesis:

H6: Perceived organizational support has positive impact on digital collaboration significantly

This study applied organizational behavior theory (Uhl-Bien, Picolo, & Schermerhorn Jr., 2020) as guiding principle. Work productivity is viewed as behavior in organization. As a behavior, Work productivity is derived by individual, group, and organizational factors. This study determines that digital skill as personal driver of work productivity which emerge from the internal of people itself. Digital collaboration as group driver of work productivity which derived from people directly interact in daily organizational activity. Finally, perceived organizational support was determined as organizational driver which happened and provides by the organization. According to all previous explanation, this study attempts to elaborate the work productivity and to scrutinize its influential drivers. Are digital skill, digital collaboration, and perceived organizational support influential drivers for work productivity?

3 Methodology

This article was based on quantitative research of Indonesia citizen who work in office. Data was collected by distributing the digital questionnaires in professional network of the researchers through the social media. The research come from eight higher educational institutions in Indonesia: Universitas Bina Nusantara (Jakarta), STMIK Indonesia (Padang), Universitas Jember (Jember), Universitas Widya Mataram (Yogyakarta), Universitas Riau (Pekanbaru), Universitas Islam Malang (Malang), Universitas Trunojoyo (Madura) and STIE Pariwisata Indoensia (Semarang).

This article involved 813 office workers as respondents. Most of them (75%) are working for an organization (75%) permanently, while rest of them are working for many organizations temporarily. The biggest respondent group private company employees (40%) dan as the civil servant (28%). Based on organizational structure, the respondents are divided into people with functional position as specialist, expert, or advisor (37%)) and people with structural position in their organization (63%). People with structural position consist of individual contributor (36%) and as structural managers (27%). Most of them (70%) experience work from home as the first-time experience. Only 18,6% of them ever conduct work from home before Covid-19 pandemics.

This article involved working people from 32 of 34 provinces in Indonesia. Papua Barat and Gorontalo have no representative in this study. Based on e demographical profile, the respondent is distributed by gender equally – men (50,36%) and woman (49,64%). They are mostly (64%) more than 30-year-old with work experience more than 5 years in their organization (72%). They have master's and bachelor's degree as educational background (70%). Most of them (81%) stay at six provinces (Jakarta, Yogyakarta, Jawa Barat, Sumatra Barat, Jawa Tengah, and Jawa Timur). Generally, they are citizen in Sumatera (21%) and Jawa (70%). For more detailed information, Table 1 demonstrates the profile of respondents.

Because the study is exploratory research, the principle of partial least squares structural equation modeling (PLS SEM, variance-based SEM) are used in this article. SmartPLS application version 3 application is used as the statistic tool for testing the measurement and structural model. The second order type is applied for the research model. All variables are reflected into dimensions and all dimensions are indicated by several items. Work productivity is adapted from concept of "how effective is telecommuting" (Allen, Golden, & Shockley, 2015).

The construct of work productivity is reflected into two dimensions: Objective Outcome - which indicated by WFH01, WFH02, and WFH03 and Subjective Outcome which indicated by WFH04, WFH05, and WFH06. Digital Skill is adapted previous study (Van Deursen, Helsper, & Eynon, 2016) about measuring digital skill. In this article, digital skill is explained by four dimensions: Digital Technical Skill (DIS01, DIS02); Digital Communication Skill (DIS03, DIS04); Digital Analytics Skill (DIS05, DIS06), and Digital Mindset (DIS07). Digital Collaboration is adapted from concept of technological use in collaboration (Easley, Devaraj, & Crant, 2003). Digital Collaboration is reflected in Characteristics (KOL01, KOL02), Job Type (KOL03, KOL04), Quality (KOL05, KOL06) and Technology Use (KOL07, KOL08). Perceived Organizational Support (POS) is adapted from concept of previous research (Lynch, Eisenberger, & Armeli). POS is explained in Appreciation (POS01, POS02); Development (POS03, POS04); Working Condition (POS05, POS06) and Well-Being (POS07, POS08).

4 Measurement Model

Second order model is used for measurement model of this article. In second order model, all variables are reflected into dimensions and indicators. Measurement model is demonstrated in Figure 1. The result of validity and reliability analysis on the measurement model is available in Table 2 and Table 3. Validity analysis on items used outer loading or loading factor, while validity analysis on variables and dimensions used convergent and/or discriminant

validity. Reliability analysis is based on internal consistency and/or composite reliability. Table 2 presents average variance extracted (AVE). composite reliability (CR), Cronbach's alpha (CA), and outer loading (OL). Table 3 presents the discriminant validity. For item validity, outer loading score is used as parameter. An item is valid, when the OL more than 0,60 for exploratory study and more than 0,70 for confirmatory6 (Hair, Hufit, Ringle, & Sarstedt, 2014). Because it is an exploratory, an item is valid when OL more than 0,60. Table 2 informs that OL score of all items of all variables are more than 0,6 even more than 0.7. It means that all items of the measurement model are valid.

For analyzing the validity of dimensions and variables, this article used average variance extracted (AVE) score for convergent validity and squared root of AVE for discriminant validity. Variable or dimension is convergent valid when AVE more than 0,5. Table 2 presents AVE score of all variables and its dimension are more than 0,5; it means that all dimensions and variables are convergent valid. Table 3 presents all squared root of AVE (diagonally bold blue colored score) are more than 0,7 and bigger than its biggest correlation with any other constructs. It means that all dimensions of all variables are discriminant valid. Based on validity analysis item, convergent, and discriminant; measurement model of this article has valid items, dimensions, and variables.

For analyzing the reliability of dimensions and variables, this article used CA score for internal consistency reliability and CR score for composite reliability. Table 2 present all variables, and its dimension has CA score are more than 0,7; except Characteristics and Job Type dimension. It means that all variables and dimension are internal consistency reliable, except Characteristics and Job Type dimension. Table 2 presents CR score of all variables and its dimensions are more than 0,7. It means that all dimensions and variables are composite reliable. According to the result of reliability analysis, this article uses reliable variables and dimensions totally for measurement.

5 Results and Discussions

In second order model, the variable is reflected in dimensions and dimension is measured by items. Table 4 shows the path coefficient, t-Statistics, and p-Values of all variables to its dimensions. The p-Values scores 0,000 and t-Statistics scores from 35,598 to 241,364. If p- Values scores less than 0,05 or t-Statistics scores more than 1,96; it means that all path coefficients from variables to its dimensions are significant. All variables of measurement model are reflected significantly on its dimensions.

Work Productivity is reflected into Objective Outcome (0,935) and Subjective Outcome (0,950) significantly and equally. Digital Skill is reflected into Digital

Technical (0811), Digital Communication (0,857), Digital Analytics (0,878) and Digital Mindset (0,767) significantly. Digital Collaboration is reflected into Characteristics (0,829), Job Type (0,802), Quality (0,869), and Technology Use (0,819) significantly and equally. Perceived Organizational Support is reflected in Appreciation (0,895), Development (0,887), Working Condition (0,917), and Well Being (0,901) significantly

The research model which is demonstrated in Figure 1 consists of structural and measurement model. Measurement model demonstrates the relationship variables and its dimensions and items. Structural model explains the relationship among variables. Hypothesis testing is conduct for examining the structural model. The result of hypothesis testing is displayed in Table 5.

Because its path coefficient having t-Statistics more than 1,98 or p-Value less than 0,05; four hypothesizes (H1, H3, H4, and H6) are accepted. It means that the path coefficient is not zero and it explains there is significant impact between one variable to another. The other hypothesizes (H2 and H5) are rejected. Because its path coefficient is not significant. The path has t-Statistics less than 1,98 or p-Values more than 0,05. The result of hypothesis explains that WFH productivity is influenced significantly by Digital Skill and Perceived Organizational Support significantly. Digital Collaboration does not influence Work Productivity significantly.

Perceived Organizational Support also influence Digital Collaboration significantly but does not influence Digital Skill significantly. Digital Collaboration influences Digital Skill significantly. According to the result of hypothesis testing, Digital Collaboration influence Work Productivity indirectly. Digital Collaboration influences Digital Skill and then Digital Skill influences Work Productivity. Digital Skill plays a mediating role in the relationship between Digital Collaboration and Work Productivity. Perceived Organizational Supports impacts on Digital Skill indirectly. Perceived Organizational Support impacts on Digital Collaboration and then Digital Collaboration impacts on Digital Skill. Digital Collaboration plays a mediating role in the relationship between Perceived Organizational Support and Digital Skill.

6 Conclusion

Digital skill of working citizen and the perceived organizational support are the influential driver of work productivity. Digital collaboration is not a driver for work productivity. It influences work productivity indirectly. Digital collaboration which improves the digital skill of working citizen will impact on work productivity. For the future studies, it is recommended to use other factors which influenced productivity in individual, group and organizational scope. The

collecting data may be expanded in collecting data in Kalimantan, Sulawesi, Papua, and small islands in Indonesia.

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