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- To:** kepada saya
- Date:** Jum, 29 Jul 2022, 09:22
- Subject:** Your paper has been published in IJSDP (Vol. 17, No. 4, 2022)!
- Body:**

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Thanks for patronizing *International Journal of Sustainable Development and Planning (IJSDP)* for publishing your research. The electronic version of your paper published in Volume 17, Number 4, 2022 is attached with this email. To read your paper online, please click: <https://www.iieta.org/journals/ijsdp/paper/10.18280/ijsdp.170408>

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Technopreneurship-Based Competitiveness and Innovation at Small Business in Gorontalo City

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ABSTRACT

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Business today has been globalized. This has made business even more competitive. Companies, regardless of their size, have to improve their competitiveness. Sustainable competitiveness is the core need for innovation. This study aims at exploring the correlation between IT-based innovation or technopreneurship and business competitiveness. This was a quantitative study with survey method. The respondents in this study were Small business owners in handicraft and creative content production in Gorontalo city. The data were collected by online form and after three month collecting data, data were collected were 163 respondents. **Product, process and organizational innovation and business competitiveness instruments use instruments from previous research. All instruments use a Likert scale with points 1 to 5 which indicate a scale of disagreement to agreement from the respondents.** The data were analyzed using PLS-SEM. The Results show that information technology-based product innovation, IT based process innovation, and IT organizational innovation significantly and positively influence the growth of business competitiveness. Product innovation of business owners in Gorontalo city, Indonesia is actively producing new products. Also, innovation is not only limited to product innovation but also production process innovation, which uses information technology. Utilization of technopreneurship is significantly able to increase business competitiveness, especially for small businesses in Gorontalo city. Utilization of innovation in information technology assumed to strongly develop business competitiveness. **The business competitiveness of small businesses in the high-tech field is influenced by products, processes and organizational innovation.** SMEs must be able to create products, or product segments, and services that exceed the performance limitations of traditional products by utilizing everything possible through digital models

1. INTRODUCTION

Today globalized business has created a highly competitive business environment. Companies, regardless of their sizes; small- or large-scale business, have to strengthen their competitiveness. Schumpeter writes that both large and small enterprises are demanded to have entrepreneurship spirit shown through companies' innovative activities [1]. Innovation is major effort to develop and maintain the sustainability of company's competitiveness[2][3].

Global Competitiveness Index (GCI) in 2017 and 2018 records showed that Indonesia's competitiveness decreased from the 31st position within the period of 2016-2017 to the 45th position within the period of 2017-2018. This was far behind Singapore who sits in the first rank among ASEAN countries and the second position of the world, Malaysia who

sits in the second rank among ASEAN countries and 25th rank in the world, as well as Thailand who sits in the 3rd rank among ASEAN countries and globally sits on the 38th rank. In other words, enhanced innovation capabilities in Indonesia should be top priority to catch up their aperture.

The concept of competitiveness is made of competitive advantage and comparative advantage, where these two concepts basically discuss the advantage competitiveness through business ability to shift the supply curve to gain efficient and competitive price[4]. Creating competitive good price, firm needs various strategies that correlates with production, consumption, market structure, and industrial condition concepts. Competitiveness can be developed by utilizing five components of cost, quality, flexibility, shipping, and innovation[5].

One of the most important components of those five components is innovation. Innovation could be the missing key due of through innovation it is assumed that company is able to develop fast adaptive business. Sustainable competitiveness is the core of the need for innovation[6]. Porter (2011) links business competitiveness with human resource knowledge, skill, and ability. Further, he describes that competitiveness of a nation is no longer determined by its natural resources and cheap labor, rather by innovation ability from utilization of knowledge. Several researches in Indonesia have confirmed the statement[7]. One of them were describes that appropriate human resource through their knowledge, skill, ability and personality were fit with the need of organization, could create the culture of knowledge transfer, that culture could be very useful to increase business innovation capabilities[8].

Innovation, among others is manifested through the ability to make business more innovative by employing appropriate information technology. In this knowledge-based economy era, entrepreneurship-based business development is the creation of ability to utilize appropriate technology to optimize business[9]. This concept is commonly known as technopreneurship. Technopreneurship is a collaboration between technology implementation an instrument and entrepreneurship as a need [10]. The technopreneurship involves two key elements, technology used by business owners to meet the customers' demand, target customers, and optimum economics, social, and environmental benefits[11].

Some of the results of previous research related to business competition, innovation, technopreneurship, small business, namely process, marketing and organisational innovations had positive significant effect on competitiveness, while product innovation had positive non-significant effect [12], Technology innovation acts as a catalysts for sustainable development [13], technology innovations influence employment creation in small businesses positively and act as a driving force for economic development [14], there are five inhibiting factors of SMEs' technology innovation: government support, quality of human resources, funding of technological innovation, economic conditions and business partners [15].

The research conducted on small business (employees below 20, based on Indonesia Central Statistic bureau criteria) on high technology cluster. Micro, small and medium enterprises according to the Law of the Republic of Indonesia number 20 of 2008 concerning micro, small and medium enterprises in Chapter I General Provisions, Article 1, namely: Micro Enterprises are productive businesses owned by individuals and/or individual business entities that meet the criteria for Micro Enterprises as regulated in this Law; Small Business is a productive economic business that stands alone, which is carried out by individuals or business entities that are not subsidiaries or not branches of companies that are owned, controlled, or become part either directly or indirectly of Medium Enterprises or Large Businesses that meet the Business criteria. Small as referred to in this Law; Medium Enterprises are productive economic businesses that stand alone, which are carried out by individuals or business entities that are not subsidiaries or branches of companies that are owned, controlled, or become a part either directly or indirectly with Small Businesses or Large Businesses with total net assets or annual sales proceeds as regulated in this Law. This approach was quite new, due of lack previous research discuss it. Majorities of previous research only

involve large scale business and have adequate research and development department and strategic. Even though small business had limitedness on research and development approach, but they have high potency on national economic growth[8].

Small businesses are the majorities business in Indonesia, whose contribution to the national economy is enormous. To represent research object, the city of Gorontalo was chosen. Gorontalo City is one of emerging market in Indonesia, which is currently growing rapidly. This is evidenced by their economic growth of 6.4% in 2019[16], higher than Indonesia's economic growth in 2019 which only reached 5.02%[16]. Mention from that official news small business in Gorontalo played an important role in supporting Gorontalo economic growth.

This study aims at exploring the correlation between IT-based innovation or technopreneurship and business competitiveness.

2. METHOD

This is a quantitative study with explanatory and survey method. In this study, the primary data were used by employing the research instrument used in pervious study with several adjustments. Instruments used in this study are validity through panel experts, which consists of academics and business owners, especially small and medium enterprises owners. The process is described as follow: instrument in English is translated into Bahasa Indonesia by competent translators. Following the translation process, the instrument is consulted to the expert panels. Upon their agreement from the expert panels, the questioner is distributed to the respondents.

Gorontalo City was chosen as the research location due of the economic development background of the city. Gorontalo City is located in Gorontalo Province, a province that is relatively new as a result of regional autonomy of its separation from North Sulawesi province. Thus, Gorontalo City is a relative new city in Indonesia. Even though it is relatively new, the economic growth rate is 6.4% above the Indonesia economic growth average which is only around 5.02% in 2019[16]. This economic growth is supported, among other things, by the major role of SMEs creative enterprises as previously mentioned.

2.1 Population and sample

The respondent of this study is business owner of Small business. In practice, the owners of Small business play a dominant role. Hence, studying SME owners means studying the Small business themselves[17]. The specific respondents in this study are small business owners of handicrafts and creative contents (photo editing, video, and website production) in Gorontalo city, Indonesia which proportionally distributed to 500 respondents through online questionnaire (using Survey Monkey Application). The questionnaire link is sent through text message, WhatsApp, messenger, e-mail any other social media. There were 500 distributed questionnaire set, only 163 who returned the questionnaire completely filled for the period of three months (September, October, November 2019) data collection.

The number of samples analyzed were 163 respondents from 500 target respondents. This still meets the criteria if using the Slovin formula with a margin of error of 5%, the sample size is 222 respondents. Thus, the achievement of filling out the questionnaire is 73.43%.

Table 1. Characteristic of Respondent

Profile	(n = 163)	%
Sex		
Male	46	73.13
Female	17	26.86
Age Average	41,5	
Education		
Elementary school	4	5.97
Junior high school	15	23.38
Senior high school	21	33.33
Diploma	7	12.43
Bachelor	16	24.87
Positions		
Manager	15	23.38
Owner	31	49.75
Manager and owner	17	26.86

Table 1 shows that for 163 respondents, the data shows that the dominance of men in business is very high. This is consistent with the basic nature of men as the backbone of the family economy. One hundred and Sixty-three (63) respondents who managed to collect data had an average age of 41.5 years or if rounded off to an average age of 42 years. Forty-two (42) years old can be considered as productive age and experienced. High school education or equivalent has the highest portion. That number shown us the possibility of a lack of innovation capabilities due to weakness in absorptive capacities[18][1]. Then as many as 63 respondents, most of whom (49.75%) are business owners and the rest are managers who are also owners and managers / managers.

2.2 Measurement

The questionnaire was adopted from previous research, namely product, process and organizational innovation items [6] and business competitiveness [19]. All instruments use a Likert scale with points 1 to 5 which indicate a scale of disagreement to agreement from the respondents. All existing instruments are then adjusted to the object of research, which will be explained in the next section.

2.3 Face Validity and Content Validity

In implementing face validity in this study, it applies 5 steps. The first step begins by adopting research instruments that already had been used by other researchers. Instruments preferably use original instruments or those from the original researcher that match the definition and indicators. The second step, namely translating English into Indonesian using back-to-back method, this step involves the professional language institute. This step is important because English words have many meanings and the translation must be adjusted to the context of the study so that the original meaning and meaning of the instrument is not misperceived by the respondent. The third step is to consult with academics regarding instruments that have been translated according to the research context and suitable for use by the object of research. Academics involved include academics from Gorontalo State University, Sam Ratulangi University and Manado State University which have adequate competences in the creative industry of Small business. An important result of the consultation was an agreement to change the words in the instrument "I" to "we", in order to reduce bias in answering statements. The word "we" is considered more suitable for identifying respondents to represent the organization than the word "I" which is more likely to answer based on personal feelings rather than organization.

2.4 Convergent Validity and Reliability Tests.

Even though the instrument has been tested by the panel experts for its appropriateness to collect the data, and using instrument from previous research, to convinced statistical validity and reliability test were still carried out. Convergent validity test of Average Variance Extracted (AVE) score higher than 0.5 is considered reasonable to measure validity[20]. Cronbach alpha score above 0.6 were acceptable even score higher than 0.7 is considered ideal number[21]. The result of the convergent validity and reliability test is presented in table 2.

Table 2. Convergent Validity and Reliability Test

Dimension	Instrument	AVE Value	Cronbach alpha
IT Product Innovation	x1. Within the last three years we have created new products using relatively new technology x2. Within the last three years we have created new product design employing technology X3. Our product components use new components	0.513	0.742
IT Process Innovation	x4. Within the last three years our production has been carried out using new production method x5. Within the last three years, we have accepted new method of payment *	0.529	0.762
IT Organizational Innovation	x6. Within the last three years we have used technology application to appraise employees' performance.	0.551	0.771
Business competitiveness	y1. We are able to create products with affordable price y2. We are able to suppress our production cost efficiently y3. We are able to create products that cannot be easily copied by our competitors y4. We created products that are different from our competitors' *	0.552	0.713

*drop item

Information was showed on table 2 explained that item statement x5 and y4 must be dropped due they only reach below 0.5 of factor loading and made AVE score on its constructs also lower than 0.5. After treatment on the problem, all the constructs reached acceptable score. In other word convergent validity as seen in table 2 well acceptable. In table 2 also showed that reliabilities the constructs were reach ideal number, which higher than 0.7. Thus, from table 2 it can be concluded that statistic validity and reliability had qualify to be proceed to hypothesis test.

2.5 Data analysis

Data analysis technique PLS-SEM were used support that statement. Collected data were analyzed using PLS-SEM model of SmartPLS 2.0M3 software. This technique was employed as the research model is inter-dimensional. Thus,

the PLS-SM was an appropriate approach to anticipate this. Further, with only 163 respondents, PLS-SEM was a wise option for data analysis. PLS-SEM is a data analysis technique to produce powerful statistical result regardless of the small size sample[20]. PLS-SEM, if appropriately applied, is indeed a “silver bullet” for estimating causal models in many theoretical models and empirical data situations[22].

3. RESULTS & DISCUSSION

After the validity and reliability tests successfully executed. Following the validity and reliability tests, the analysis of the data is carried out using the SmartPLS 2.0 M3 application. The result is presented in Table 3 below:

Table 3. Hypothesis Test

	Original Sample (O)	Deviation Standard	T-stat Value	Remarks
IT Product innovation à competitiveness	0.374	0.172	2.179	Significant
IT process innovation à competitiveness	0.752	0.099	7.67	Significant
IT organizational innovation à competitiveness	0.289	0.094	3.094	Significant

* Smart PLS-SEM Data Report, 2019.

Table 3 showed that information technology-based product innovation, IT based process innovation, and IT organizational innovation significantly and positively influence the growth of business competitiveness. This is empirical evident in all the T-stat values that are above 1.960[20]. Therefore, it can be concluded that all of hypothesis accepted. That result means that utilization of technopreneurship is significantly able to increase business competitiveness, especially for small businesses in Gorontalo city. In other words, the hypothesis suggested before were proven and accepted.

This result backs up Jabeur and Karuranga (2013) research who described that current business environment demands business owners to quickly adapt to the changes to use Information technology to remain competitive[23]. Utilization of technology has impact on the increase of performance, including time efficiency and better decision-making[24]. Organizational innovation practices through utilization of information technology is closely related with improvement of productivity and rapid innovation[25].

Using the data of European Union countries Petrakis et al. (2015) revealed that business competitiveness highly dependent on innovation culture as long-term strategic instrument[26]. Dobrovic et al. (2018) were considered the same result, they convinced that innovation and business competitiveness were highly related and present the level of competitiveness on European[27].

Good policy has repeatedly encouraged competitiveness not just at the level of firm but also regional levels, as well as foster innovation and new product development[28][29]. On the cluster of Small business, the level of innovation is indispensable to compete on high-tech and highly competition[30]. There were findings suggest a significant impact of entrepreneurial leadership on innovation work behavior and opportunity recognition of employees in the high-tech Small business[31]. From this information the

lesson learned were innovation has high role in the competitiveness of Small business and network to enhancing the function of a high-technology Small business cluster[32]. In other words, innovation and business competitiveness could be footprint on Small business development and sustainability.

Product innovation of business owners in Gorontalo city, Indonesia is actively producing new products. Also, innovation is not only limited to product innovation but also production process innovation, which uses information technology. One of these innovations is by changing the product design to make it hard for the competitors to copy the product and create different products. The developed innovation process enables the business owners to gain new opportunities for their products to meet the fast-changing demand of the current trends and customers' demand. Therefore, the product meets the customers' satisfaction. Sylvana and Awaluddin (2017) described that the innovative product is to meet the market demand, thus, the product is one of the things that can be used as competitive advantages of the company[10].

By utilizing information technology in the business field, it will have a major positive impact on the business nets that build. Advances in technology and information can help companies reduce production costs so, by reducing the company's operating costs allowing optimal profit. In other words, the role of information technology development today cannot be separated from the business activities, due of the development of information technology can provide various advantages and conveniences in carrying out business activities. IT-based organizational innovation enables employees' performance to be objectively measured. Sufficient reward for employees can be disbursed through measurable performance and similarly punishment can be made based on objective indicators. The comparison between the target and work result can be easily measured and considered more transparent as it uses information technology. For instance, through information technology enable

employees to use digital attendance, this is highly beneficial for field workers, thus, their field works will be better monitored. The daily example of this is that online transportation can provide sense of security for the driver and passengers due to the GPS technology attached to these online transportation applications. Crimes report reported to the online transportation business can be easily tracked by the police to solve.

Small business need to develop their network and or collaborate with large scale business. Thus, it will increase opportunities the occurrence of transfer of technology. For instance, many Small business nowadays market their product on online marketplace such as Lazada, Shopee or even by Facebook marketplace etc. This network could enhance their possibility to have better sales, market and market share. Dyer and Nobeoka (2000) on their qualitative research were revealed about Toyota and their knowledge sharing network between Small business partner to increased Toyota efficiency on production process, product and their financial benefit. The lesson from this statement is Small business the chance of high technology cluster to sustain will more possible[33].

Meanwhile Small business also cannot forget about their obtain network on other Small business. Even though in real business practices between Small business could act as competitor, however among Small business are not also considered as competitors but also can act as partner. For instance, cluster of Small business at Special Province of Yogyakarta made their consumer more satisfied due of the buyer order could 100 percent completed and minimize the risk of rejected order due of limited production capacities or other reasons. Among Small business could be built mutually beneficial cooperation and hand on hand operation to make customer needs. This corporation could fill the gap between underemployed or limitedness of production capacity

3.1 Research Limitation

Just like any other research, this research cannot be separated from the limitations of the study. The first limitation that could be made is research location were only concentrated in Gorontalo. This selection has a risk of generalizing the results of the study, perhaps the study could be generalized in Gorontalo, but not necessarily generalizable for other regions. Indonesia is an archipelago country that has a wide variety of cultures that are very likely to have an impact on differences in research results. Through further research it is expected to produce empirical evidence that is broader. Ideally, this research can be carried out in all provinces in Indonesia. The second limitation that can be conveyed were that the data collection time is only limited to one particular time, or it can be called the limitation of cross section. This approach has the disadvantage of capturing respondent perceptions in the post-data-collection period. Further research using longitudinal data collection is wisely can choose.

4 CONCLUSION

The conclusion is that the business competitiveness of small businesses in the high-tech field is influenced by products, processes and organizational innovation. In other words, it is strongly influenced by the uniqueness produced by small businesses, especially in Gorontalo City. The uniqueness is in the form of product results, production process and how to manage the business.

Based on that conclusion, small business must be able to create products, or product segments, and services that exceed the performance limitations of traditional products by utilizing everything possible through digital models. For instance, Small business can take advantage of the trace data that can be obtained from current consumer behavior. For example, whenever a potential customer changes the screen of a mobile device or uploads something on social media, they will leave an information trail related to their preferences and behavior. This allows business owners to understand consumer patterns and behavior beyond traditional boundaries, while knowing the facts of how their consumers interact with the online and offline world around them.

The next research can compare between Micro Enterprises, Small Businesses, and Large Businesses, and Ideally, this research can be carried out in all provinces in Indonesia.

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REFERENCES

- [1] N. F. Wuryaningrat, "Knowledge Sharing, Absorptive Capacity and Innovation Capabilities: An Empirical Study on Small and Medium Enterprises in North Sulawesi, Indonesia," *Gadjah Mada International Journal of Business*, vol. 15, no. 1, pp. 61–77, 2013, doi: 10.22146/GAMAJIB.5402.
- [2] N. Ikujiro and H. Takeuchi, *The Knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford university press, 1995.
- [3] I. Nonaka, G. Von Krogh, and S. Voelpel, "Organizational Knowledge Creation Theory: Evolutionary Paths and Future Advances," *Sage Journals*, vol. 27, no. 8, pp. 1179–1208, 2006, doi: 10.1177/0170840606066312.
- [4] A. Sylvana and M. Awaluddin, "Model Penciptaan Daya Saing Bisnis Melalui Transformasi Kewirausahaan Berbasis Teknologi Informasi (Technopreneur)," Universitas Terbuka Convention Center (UTCC), Nov. 2017, pp. 71–81. Accessed: Apr. 16, 2022. [Online]. Available: <http://ut.ac.id>
- [5] S. N. Russell and H. H. Millar, "Exploring the Relationships among Sustainable Manufacturing Practices, Business Performance and Competitive Advantage: Perspectives from a Developing Economy," *Journal of Management and Sustainability*, vol. 4, no. 3, 2014, doi: 10.5539/JMS.V4N3P37.
- [6] J. A. Johannessen, B. Olsen, and G. T. Lumpkin, "Innovation as newness: What is new, how new, and new to whom?," *European Journal of Innovation Management*, vol. 4, no. 1, pp. 20–31, 2001, doi: 10.1108/14601060110365547/FULL/XML.
- [7] M. E. Porter, *Competitive advantage of nations: creating and sustaining superior performance*. simon and schuster. 2011.
- [8] N. F. Wuryaningrat, P. Kindangen, G. Sendow, B. Lumanouw, and L. I. Kumajas, "'One Shot' Knowledge Transfer: Is It Possible? (Empirical Study on the

- Indonesian Creative Industry),” *International Journal of Innovation, Creativity and Change*. www.ijicc.net, vol. 10, no. 7, 2019.
- [9] Harjono, A. Widyatmoko, and T. Nurhidayat, “Pembelajaran Kewirausahaan Politama,” *Prosiding KNIT RAMP-IPB*, pp. 27–32, 2013.
 - [10] A. Sylvana and M. Awaluddin, “Model Penciptaan Daya Saing Bisnis Melalui Transformasi Kewirausahaan Berbasis Teknologi Informasi (TECHNOPRENEUR),” *Buku Prosiding Entrepreneurship at Global Crossroad: Challenges and Solutions*, pp. 71–81, 2017.
 - [11] O. Suparno, A. Hermawan, M. Faiz Syuaib, E. Nugroho, and E. Anggraeni, “Peningkatan Minat Dan Kemampuan Technopreneurship Melalui Workshop Satu Hari,” in *Prosiding KNIT RAMP-IPB*, 2013, pp. 131–139.
 - [12] M. N. Kiveu, M. Namusonge, and S. Muathe, “Effect of innovation on firm competitiveness: the case of manufacturing SMEs in Nairobi County, Kenya,” *International Journal of Business Innovation and Research*, vol. 18, no. 3, pp. 307–327, Jan. 2019, doi: 10.1504/IJBIR.2019.098251.
 - [13] S. M. Chege and D. Wang, “The influence of technology innovation on SME performance through environmental sustainability practices in Kenya,” *Technology in Society*, vol. 60, p. 101210, Feb. 2020, doi: 10.1016/j.techsoc.2019.101210.
 - [14] S. M. Chege and D. Wang, “Information technology innovation and its impact on job creation by SMEs in developing countries: an analysis of the literature review,” *Technology Analysis & Strategic Management*, vol. 32, no. 3, pp. 256–271, Mar. 2020, doi: 10.1080/09537325.2019.1651263.
 - [15] H. Indrawati, Caska, and Suarman, “Barriers to technological innovations of SMEs: how to solve them?,” *International Journal of Innovation Science*, vol. 12, no. 5, pp. 545–564, Jan. 2020, doi: 10.1108/IJIS-04-2020-0049.
 - [16] BPS, “Berita Resmi: Pertumbuhan Ekonomi Gorontalo 2019. No.12/02/75/Th. XIV,” 2019.
 - [17] M. J. K. Stanworth and J. Curran, “Growth And The Small Firm — An Alternative View,” *Journal of Management Studies*, vol. 13, no. 2, pp. 95–110, 1976, doi: 10.1111/J.1467-6486.1976.TB00527.X.
 - [18] A. Lund Vinding, “Absorptive capacity and innovative performance: A human capital approach,” *Economics of Innovation and New Technology*, vol. 15, no. 4–5, pp. 507–517, 2007, doi: 10.1080/10438590500513057.
 - [19] J. Barney, “Firm Resources and Sustained Competitive Advantage,” *Journal of Management*, vol. 17, no. 1, pp. 99–120, Mar. 1991, doi: 10.1177/014920639101700108.
 - [20] J. F. Hair, W. C. Black, B. J. Babin, R. E. Anderson, and U. Saddle River Boston Columbus San Francisco New York Indianapolis London Toronto Sydney Singapore Tokyo Montreal Dubai Madrid Hong Kong Mexico City Munich Paris Amsterdam Cape Town, *MULTIVARIATE DATA ANALYSIS A Global Perspective*. New Jersey: Prentice Hall, 2010.
 - [21] J. C. Nunnally, *Psychometric theory*. McGraw-Hill, 1978.
 - [22] J. F. Hair, C. M. Ringle, and M. Sarstedt, “PLS-SEM: Indeed a Silver Bullet,” *Journal of Marketing Theory and Practice*, vol. 19, no. 2, pp. 139–152, 2014, doi: 10.2753/MTP1069-6679190202.
 - [23] F. Jabeur, M. Mohiuddin, and E. Karuranga, “Timeline of Initial Perceptions and Adoption of e-Business Among Quebec Forestry Sector SMEs,” *Communications of the IIMA*, vol. 13, no. 3, 2014.
 - [24] N. Jones and T. Kochtanek, “Consequences of Web-based technology usage,” *Online Information Review*, vol. 26, no. 4, pp. 256–264, 2002, doi: 10.1108/14684520210438697.
 - [25] L. Hermana, *Internet users are shaking the tree of science*. QUA-DERNS, 2008.
 - [26] P. E. Petrakis, P. C. Kostis, and D. G. Valsamis, “Innovation and competitiveness: Culture as a long-term strategic instrument during the European Great Recession,” *Journal of Business Research*, vol. 68, no. 7, pp. 1436–1438, 2015, doi: 10.1016/J.JBUSRES.2015.01.029.
 - [27] J. Dobrovic, P. Gallo, B. Mihalcova, L. Stolfova, and P. Szaryszova, “Competitiveness Measurement in Terms of the Europe 2020 Strategy,” *Journal of Competitiveness*, vol. 10, no. 4, pp. 21–37, 2018, doi: 10.7441/JOC.2018.04.02.
 - [28] G. Cappiello, F. Giordani, and M. Visentin, “Social capital and its effect on networked firm innovation and competitiveness,” *Industrial Marketing Management*, vol. 89, pp. 422–430, 2020, doi: 10.1016/J.INDMARMAN.2020.03.007.
 - [29] X. Zhao and B. Sun, “The influence of Chinese environmental regulation on corporation innovation and competitiveness,” *Journal of Cleaner Production*, vol. 112, pp. 1528–1536, 2016, doi: 10.1016/J.JCLEPRO.2015.05.029.
 - [30] L. Manuel, C. Farinha, J. José, M. Ferreira, J. José, and B. Gouveia, “Innovation and Competitiveness: A High-Tech Cluster Approach The Romanian Review Precision Mechanics,” *Optics & Mechatronics*, no. 45, 2014.
 - [31] A. Bagheri, “The impact of entrepreneurial leadership on innovation work behavior and opportunity recognition in high-technology SMEs,” *The Journal of High Technology Management Research*, vol. 28, no. 2, pp. 159–166, 2017, doi: 10.1016/J.HITECH.2017.10.003.
 - [32] L. Farinha and S. Bagchi-Sen, “Following the Footprints of SME Competitiveness in a High-Technology Sector,” *Innovation, Technology and Knowledge Management*, pp. 77–95, 2018, doi: 10.1007/978-3-319-74881-8_6.
 - [33] J. H. Dyer and K. Nobeoka, “Creating and managing a high-performance knowledge-sharing network: the Toyota case,” *Strategic Management Journal*, vol. 21, no. 3, pp. 345–367, 2000, doi: [https://doi.org/10.1002/\(SICI\)1097-0266\(200003\)21:3<345::AID-SMJ96>3.0.CO;2-N](https://doi.org/10.1002/(SICI)1097-0266(200003)21:3<345::AID-SMJ96>3.0.CO;2-N).

Dear Editor

Thank you for your comment

I attach my response based on reviewer's comments

Title of the article reviewed:

Technopreneurship-Based Competitiveness and Innovation

Summary

This study aims at exploring the correlation between IT-based innovation or technopreneurship and business competitiveness. This was a quantitative study with explanation method. The respondents in this study were Small business owners in handicraft and creative content production in Gorontalo city. The data were collected online and collected from **63 respondents**. The data were analyzed using PLS-SEM model. Results show that information technology-based product innovation, IT based process innovation, and IT organizational innovation significantly and positively influence the growth of business competitiveness. The research direction and results of this paper have certain practical significance and research value, but there are still some problems in the content of this paper.

Major Issues

Although the interview data collected in this paper can be used after scientific verification, it is still an inevitable reality that the number of people returning is too small. Moreover, the author does not discuss the influence of the high proportion of a certain group of people on the result analysis, so it is hoped that the author can make some modification for this point. In addition, there is no definite conclusion in the conclusion part of this paper, or there is no deeper analysis except that innovation has a positive influence on the organization, which makes people feel that the final result of this paper is a little unclear.

Answers:

Done

Minor Issues

ABSTRACT:

- The title of this article is a little too broad, I hope the author refine the title.

Answers:

“Technopreneurship-Based Competitiveness and Innovation at Small Business in Gorontalo City”

- The method and process of data collection are not clear, so I hope the author can be more detailed.

Answers:

The study used instruments from previous research. Instruments of product, process and organizational innovation and business competitiveness use the research instruments from Johannessen et al. (2001) and Barney (1991). All instruments use a Likert scale with points 1 to 5 which indicate a scale of disagreement to agreement from the respondents. All existing instruments are then adjusted to the object of research, which will be explained in the next section.

- Keywords do not cover the core methods used in this paper, and in general, keywords are not enough to summarize this paper, so it is suggested that the author summarize more refined keywords.

Answers:

Business Competitiveness, Innovation, Technopreneurship, Small Business

INTRODUCTION:

- There is no literature review, no introduction of other scholars' research results on this research field, research direction and research area, and no explanation of the author's thinking process.

Answers:

Done

Some of the results of previous research related to business competition, innovation, technopreneurship, small business, namely process, marketing and organisational innovations had positive significant effect on competitiveness, while product innovation had positive non-significant effect (Kiveu, Namusonge, and Muathe 2019), Technology innovation acts as a catalysts for sustainable development (Chege and Wang 2020a), technology innovations influence employment creation in small businesses positively and act as a driving force for economic development (Chege and Wang 2020b), there are

five inhibiting factors of SMEs' technology innovation: government support, quality of human resources, funding of technological innovation, economic conditions and business partners (Indrawati, Caska, and Suarman 2020)..

- How did the five important components come to this conclusion? Which article is cited?

Answers:

Using 5 components consisting of product, process and organizational innovation using research instruments from (Johannessen, Olsen, and Lumpkin 2001), while business competitiveness is based on research from (Barney 1991).

- Should I introduce the difference between small and medium enterprises and large enterprises? What criteria do I use to distinguish small and medium enterprises?

Answers:

Micro, small and medium enterprises according to the Law of the Republic of Indonesia number 20 of 2008 concerning micro, small and medium enterprises in Chapter I General Provisions, Article 1, namely: Micro Enterprises are productive businesses owned by individuals and/or individual business entities that meet the criteria for Micro Enterprises as regulated in this Law; Small Business is a productive economic business that stands alone, which is carried out by individuals or business entities that are not subsidiaries or not branches of companies that are owned, controlled, or become part either directly or indirectly of Medium Enterprises or Large Businesses that meet the Business criteria. Small as referred to in this Law; Medium Enterprises are productive economic businesses that stand alone, which are carried out by individuals or business entities that are not subsidiaries or branches of companies that are owned, controlled, or become a part either directly or indirectly with Small Businesses or Large Businesses with total net assets or annual sales proceeds as regulated in this Law.

METHOD:

- How is the questionnaire made? What criteria or template is this questionnaire based on? Is a logical loop formed and the results available?

Answers:

The questionnaire was adopted from previous research, namely product, process and organizational innovation items (Johannessen, Olsen, and Lumpkin 2001) and business competitiveness (Barney 1991). All instruments use a Likert scale with points 1 to 5 which indicate a scale of disagreement to agreement

from the respondents. All existing instruments are then adjusted to the object of research, which will be explained in the next section.

- Although the quantity recovered can be used to meet the conditions, but the recovery of various proportions to meet the requirements of scientific research? Doesn't this response ratio need to be optimized? Will such a large proportion of middle-aged men affect the final analysis of questionnaire results?

Answers:

The number of samples analyzed were 163 respondents from 500 target respondents. This still meets the criteria if using the Slovin formula with a margin of error of 5%, the sample size is 222 respondents. Thus, the achievement of filling out the questionnaire is 73.43%.

RESULTS & DISCUSSION, CONCLUSION:

The headline numbers in this section are wrong. And this part of the content is not like a conclusion of the summary, but like a variety of recommendations for small and medium enterprises.

Answers:

The conclusion is that the business competitiveness of small businesses in the high-tech field is influenced by products, processes and organizational innovation. In other words, it is strongly influenced by the uniqueness produced by small businesses, especially in Gorontalo City. The uniqueness is in the form of product results, production process and how to manage the business.

Based on that conclusion, small business must be able to create products, or product segments, and services that exceed the performance limitations of traditional products by utilizing everything possible through digital models. For instance, Small business can take advantage of the trace data that can be obtained from current consumer behavior. For example, whenever a potential customer changes the screen of a mobile device or uploads something on social media, they will leave an information trail related to their preferences and behavior. This allows business owners to understand consumer patterns and behavior beyond traditional boundaries, while knowing the facts of how their consumers interact with the online and offline world around them.

Lack of the author's future research prospects.

Answers:

Done

Recommendations:

This study aims at exploring the correlation between IT-based innovation or technopreneurship and business competitiveness. This was a quantitative study with explanation method. The respondents in this study were Small business owners in handicraft and creative content production in Gorontalo city. The author does not discuss the influence of the high proportion of a certain group of people on the result analysis, so it is hoped that the author can make some modification for this point. In addition, there is no definite conclusion in the conclusion part of this paper, or there is no deeper analysis except that innovation has a positive influence on the organization, which makes people feel that the final result of this paper is a little unclear.

Citation Article

Barney, Jay. 1991. "Firm Resources and Sustained Competitive Advantage." *Journal of Management* 17 (1): 99–120. <https://doi.org/10.1177/014920639101700108>.

Chege, Samwel Macharia, and Daoping Wang. 2020a. "The Influence of Technology Innovation on SME Performance through Environmental Sustainability Practices in Kenya." *Technology in Society* 60 (February): 101210. <https://doi.org/10.1016/j.techsoc.2019.101210>.

———. 2020b. "Information Technology Innovation and Its Impact on Job Creation by SMEs in Developing Countries: An Analysis of the Literature Review." *Technology Analysis & Strategic Management* 32 (3): 256–71. <https://doi.org/10.1080/09537325.2019.1651263>.

Indrawati, Henny, Caska, and Suarman. 2020. "Barriers to Technological Innovations of SMEs: How to Solve Them?" *International Journal of Innovation Science* 12 (5): 545–64. <https://doi.org/10.1108/IJIS-04-2020-0049>.

Johannessen, Jon Arild, Bjørn Olsen, and G. T. Lumpkin. 2001. "Innovation as Newness: What Is New, How New, and New to Whom?" *European Journal of Innovation Management* 4 (1): 20–31. <https://doi.org/10.1108/14601060110365547/FULL/XML>.

Kiveu, Mary Nafula, Mary Namusonge, and Stephen Muathe. 2019. "Effect of Innovation on Firm Competitiveness: The Case of Manufacturing SMEs in Nairobi

County, Kenya.” *International Journal of Business Innovation and Research* 18 (3): 307–27. <https://doi.org/10.1504/IJBIR.2019.098251>.

Technopreneurship-Based Competitiveness and Innovation at Small Business in Gorontalo City

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ABSTRACT

Received:

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Keywords:

*Business Competitiveness, Innovation,
Technopreneurship, Small Business*

Business today has been globalized. This has made business even more competitive. Companies, regardless of their size, have to improve their competitiveness. Sustainable competitiveness is the core need for innovation. This study aims at exploring the correlation between IT-based innovation or technopreneurship and business competitiveness. This was a quantitative study with survey method. The respondents in this study were Small business owners in handicraft and creative content production in Gorontalo city. The data were collected by online form and after three month collecting data, data were collected were 163 respondents. Product, process and organizational innovation and business competitiveness instruments use instruments from previous research. All instruments use a Likert scale with points 1 to 5 which indicate a scale of disagreement to agreement from the respondents. The data were analyzed using PLS-SEM. The Results show that information technology-based product innovation, IT based process innovation, and IT organizational innovation significantly and positively influence the growth of business competitiveness. Product innovation of business owners in Gorontalo city, Indonesia is actively producing new products. Also, innovation is not only limited to product innovation but also production process innovation, which uses information technology. Utilization of technopreneurship is significantly able to increase business competitiveness, especially for small businesses in Gorontalo city. Utilization of innovation in information technology assumed to strongly develop business competitiveness. The business competitiveness of small businesses in the high-tech field is influenced by products, processes and organizational innovation. SMEs must be able to create products, or product segments, and services that exceed the performance limitations of traditional products by utilizing everything possible through digital models

1. INTRODUCTION

Today globalized business has created a highly competitive business environment. Companies, regardless of their sizes; small- or large-scale business, have to strengthen their competitiveness. Schumpeter writes that both large and small enterprises are demanded to have entrepreneurship spirit shown through companies' innovative activities [1]. Innovation is major effort to develop and maintain the sustainability of company's competitiveness[2][3].

Global Competitiveness Index (GCI) in 2017 and 2018 records showed that Indonesia's competitiveness decreased from the 31st position within the period of 2016-2017 to the 45th position within the period of 2017-2018. This was far behind Singapore who sits in the first rank among ASEAN countries and the second position of the world, Malaysia who

sits in the second rank among ASEAN countries and 25th rank in the world, as well as Thailand who sits in the 3rd rank among ASEAN countries and globally sits on the 38th rank. In other words, enhanced innovation capabilities in Indonesia should be top priority to catch up their aperture.

The concept of competitiveness is made of competitive advantage and comparative advantage, where these two concepts basically discuss the advantage competitiveness through business ability to shift the supply curve to gain efficient and competitive price[4]. Creating competitive good price, firm needs various strategies that correlates with production, consumption, market structure, and industrial condition concepts. Competitiveness can be developed by utilizing five components of cost, quality, flexibility, shipping, and innovation[5].

One of the most important components of those five components is innovation. Innovation could be the missing key due of through innovation it is assumed that company is able to develop fast adaptive business. Sustainable competitiveness is the core of the need for innovation[6]. Porter (2011) links business competitiveness with human resource knowledge, skill, and ability. Further, he describes that competitiveness of a nation is no longer determined by its natural resources and cheap labor, rather by innovation ability from utilization of knowledge. Several researches in Indonesia have confirmed the statement[7]. One of them were describes that appropriate human resource through their knowledge, skill, ability and personality were fit with the need of organization, could create the culture of knowledge transfer, that culture could be very useful to increase business innovation capabilities[8].

Innovation, among others is manifested through the ability to make business more innovative by employing appropriate information technology. In this knowledge-based economy era, entrepreneurship-based business development is the creation of ability to utilize appropriate technology to optimize business[9]. This concept is commonly known as technopreneurship. Technopreneurship is a collaboration between technology implementation an instrument and entrepreneurship as a need [4]. The technopreneurship involves two key elements, technology used by business owners to meet the customers' demand, target customers, and optimum economics, social, and environmental benefits[10].

Some of the results of previous research related to business competition, innovation, technopreneurship, small business, namely process, marketing and organisational innovations had positive significant effect on competitiveness, while product innovation had positive non-significant effect [11], Technology innovation acts as a catalysts for sustainable development [12], technology innovations influence employment creation in small businesses positively and act as a driving force for economic development [13], there are five inhibiting factors of SMEs' technology innovation: government support, quality of human resources, funding of technological innovation, economic conditions and business partners [14].

The research conducted on small business (employees below 20, based on Indonesia Central Statistic bureau criteria) on high technology cluster. Micro, small and medium enterprises according to the Law of the Republic of Indonesia number 20 of 2008 concerning micro, small and medium enterprises in Chapter I General Provisions, Article 1, namely: Micro Enterprises are productive businesses owned by individuals and/or individual business entities that meet the criteria for Micro Enterprises as regulated in this Law; Small Business is a productive economic business that stands alone, which is carried out by individuals or business entities that are not subsidiaries or not branches of companies that are owned, controlled, or become part either directly or indirectly of Medium Enterprises or Large Businesses that meet the Business criteria. Small as referred to in this Law; Medium Enterprises are productive economic businesses that stand alone, which are carried out by individuals or business entities that are not subsidiaries or branches of companies that are owned, controlled, or become a part either directly or indirectly with Small Businesses or Large Businesses with total net assets or annual sales proceeds as regulated in this Law. This approach was quite new, due of lack previous research discuss it. Majorities of previous research only

involve large scale business and have adequate research and development department and strategic. Even though small business had limitedness on research and development approach, but they have high potency on national economic growth[8].

Small businesses are the majorities business in Indonesia, whose contribution to the national economy is enormous. To represent research object, the city of Gorontalo was chosen. Gorontalo City is one of emerging market in Indonesia, which is currently growing rapidly. This is evidenced by their economic growth of 6.4% in 2019[15], higher than Indonesia's economic growth in 2019 which only reached 5.02%[15]. Mention from that official news small business in Gorontalo played an important role in supporting Gorontalo economic growth.

This study aims at exploring the correlation between IT-based innovation or technopreneurship and business competitiveness.

2. METHOD

This is a quantitative study with explanatory and survey method. In this study, the primary data were used by employing the research instrument used in pervious study with several adjustments. Instruments used in this study are validity through panel experts, which consists of academics and business owners, especially small and medium enterprises owners. The process is described as follow: instrument in English is translated into Bahasa Indonesia by competent translators. Following the translation process, the instrument is consulted to the expert panels. Upon their agreement from the expert panels, the questioner is distributed to the respondents.

Gorontalo City was chosen as the research location due of the economic development background of the city. Gorontalo City is located in Gorontalo Province, a province that is relatively new as a result of regional autonomy of its separation from North Sulawesi province. Thus, Gorontalo City is a relative new city in Indonesia. Even though it is relatively new, the economic growth rate is 6.4% above the Indonesia economic growth average which is only around 5.02% in 2019[15]. This economic growth is supported, among other things, by the major role of SMEs creative enterprises as previously mentioned.

2.1 Population and sample

The respondent of this study is business owner of Small business. In practice, the owners of Small business play a dominant role. Hence, studying SME owners means studying the Small business themselves[16]. The specific respondents in this study are small business owners of handicrafts and creative contents (photo editing, video, and website production) in Gorontalo city, Indonesia which proportionally distributed to 500 respondents through online questionnaire (using Survey Monkey Application). The questionnaire link is sent through text message, WhatsApp, messenger, e-mail any other social media. There were 500 distributed questionnaire set, only 163 who returned the questionnaire completely filled for the period of three months (September, October, November 2019) data collection.

The number of samples analyzed were 163 respondents from 500 target respondents. This still meets the criteria if using the Slovin formula with a margin of error of 5%, the sample size is 222 respondents. Thus, the achievement of filling out the questionnaire is 73.43%.

Table 1. Characteristic of Respondent

Profile	(n = 163)	%
Sex		
Male	46	73.13
Female	17	26.86
Age Average	41,5	
Education		
Elementary school	4	5.97
Junior high school	15	23.38
Senior high school	21	33.33
Diploma	7	12.43
Bachelor	16	24.87
Positions		
Manager	15	23.38
Owner	31	49.75
Manager and owner	17	26.86

Table 1 shows that for 163 respondents, the data shows that the dominance of men in business is very high. This is consistent with the basic nature of men as the backbone of the family economy. One hundred and Sixty-three (63) respondents who managed to collect data had an average age of 41.5 years or if rounded off to an average age of 42 years. Forty-two (42) years old can be considered as productive age and experienced. High school education or equivalent has the highest portion. That number shown us the possibility of a lack of innovation capabilities due to weakness in absorptive capacities[17][1]. Then as many as 63 respondents, most of whom (49.75%) are business owners and the rest are managers who are also owners and managers / managers.

2.2 Measurement

The questionnaire was adopted from previous research, namely product, process and organizational innovation items [6] and business competitiveness [18]. All instruments use a Likert scale with points 1 to 5 which indicate a scale of disagreement to agreement from the respondents. All existing instruments are then adjusted to the object of research, which will be explained in the next section.

2.3 Face Validity and Content Validity

In implementing face validity in this study, it applies 5 steps. The first step begins by adopting research instruments that already had been used by other researchers. Instruments preferably use original instruments or those from the original researcher that match the definition and indicators. The second step, namely translating English into Indonesian using back-to-back method, this step involves the professional language institute. This step is important because English words have many meanings and the translation must be adjusted to the context of the study so that the original meaning and meaning of the instrument is not misperceived by the respondent. The third step is to consult with academics regarding instruments that have been translated according to the research context and suitable for use by the object of research. Academics involved include academics from Gorontalo State University, Sam Ratulangi University and Manado State University which have adequate competences in the creative industry of Small business. An important result of the consultation was an agreement to change the words in the instrument "I" to "we", in order to reduce bias in answering statements. The word "we" is considered more suitable for identifying respondents to represent the organization than the word "I" which is more likely to answer based on personal feelings rather than organization.

2.4 Convergent Validity and Reliability Tests.

Even though the instrument has been tested by the panel experts for its appropriateness to collect the data, and using instrument from previous research, to convinced statistical validity and reliability test were still carried out. Convergent validity test of Average Variance Extracted (AVE) score higher than 0.5 is considered reasonable to measure validity[19]. Cronbach alpha score above 0.6 were acceptable even score higher than 0.7 is considered ideal number[20]. The result of the convergent validity and reliability test is presented in table 2.

Table 2. Convergent Validity and Reliability Test

Dimension	Instrument	AVE Value	Cronbach alpha
IT Product Innovation	x1. Within the last three years we have created new products using relatively new technology x2. Within the last three years we have created new product design employing technology X3. Our product components use new components	0.513	0.742
IT Process Innovation	x4. Within the last three years our production has been carried out using new production method x5. Within the last three years, we have accepted new method of payment *	0.529	0.762
IT Organizational Innovation	x6. Within the last three years we have used technology application to appraise employees' performance.	0.551	0.771
Business competitiveness	y1. We are able to create products with affordable price y2. We are able to suppress our production cost efficiently y3. We are able to create products that cannot be easily copied by our competitors y4. We created products that are different from our competitors' *	0.552	0.713

*drop item

Information was showed on table 2 explained that item statement x5 and y4 must be dropped due they only reach below 0.5 of factor loading and made AVE score on its constructs also lower than 0.5. After treatment on the problem, all the constructs reached acceptable score. In other word convergent validity as seen in table 2 well acceptable. In table 2 also showed that reliabilities the constructs were reach ideal number, which higher than 0.7. Thus, from table 2 it can be concluded that statistic validity and reliability had qualify to be proceed to hypothesis test.

2.5 Data analysis

Data analysis technique PLS-SEM were used support that statement. Collected data were analyzed using PLS-SEM model of SmartPLS 2.0M3 software. This technique was employed as the research model is inter-dimensional. Thus,

the PLS-SM was an appropriate approach to anticipate this. Further, with only 163 respondents, PLS-SEM was a wise option for data analysis. PLS-SEM is a data analysis technique to produce powerful statistical result regardless of the small size sample[19]. PLS-SEM, if appropriately applied, is indeed a “silver bullet” for estimating causal models in many theoretical models and empirical data situations[21].

3. RESULTS & DISCUSSION

After the validity and reliability tests successfully executed. Following the validity and reliability tests, the analysis of the data is carried out using the SmartPLS 2.0 M3 application. The result is presented in Table 3 below:

Table 3. Hypothesis Test

	Original Sample (O)	Deviation Standard	T-stat Value	Remarks
IT Product innovation à competitiveness	0.374	0.172	2.179	Significant
IT process innovation à competitiveness	0.752	0.099	7.67	Significant
IT organizational innovation à competitiveness	0.289	0.094	3.094	Significant

* Smart PLS-SEM Data Report, 2019.

Table 3 showed that information technology-based product innovation, IT based process innovation, and IT organizational innovation significantly and positively influence the growth of business competitiveness. This is empirical evident in all the T-stat values that are above 1.960[19]. Therefore, it can be concluded that all of hypothesis accepted. That result means that utilization of technopreneurship is significantly able to increase business competitiveness, especially for small businesses in Gorontalo city. In other words, the hypothesis suggested before were proven and accepted.

This result backs up Jabeur and Karuranga (2013) research who described that current business environment demands business owners to quickly adapt to the changes to use Information technology to remain competitive[22]. Utilization of technology has impact on the increase of performance, including time efficiency and better decision-making[23]. Organizational innovation practices through utilization of information technology is closely related with improvement of productivity and rapid innovation[24].

Using the data of European Union countries Petrakis et al. (2015) revealed that business competitiveness highly dependent on innovation culture as long-term strategic instrument[25]. Dobrovic et al. (2018) were considered the same result, they convinced that innovation and business competitiveness were highly related and present the level of competitiveness on European[26].

Good policy has repeatedly encouraged competitiveness not just at the level of firm but also regional levels, as well as foster innovation and new product development[27][28]. On the cluster of Small business, the level of innovation is indispensable to compete on high-tech and highly competition[29]. There were findings suggest a significant impact of entrepreneurial leadership on innovation work behavior and opportunity recognition of employees in the high-tech Small business[30]. From this information the

lesson learned were innovation has high role in the competitiveness of Small business and network to enhancing the function of a high-technology Small business cluster[31]. In other words, innovation and business competitiveness could be footprint on Small business development and sustainability.

Product innovation of business owners in Gorontalo city, Indonesia is actively producing new products. Also, innovation is not only limited to product innovation but also production process innovation, which uses information technology. One of these innovations is by changing the product design to make it hard for the competitors to copy the product and create different products. The developed innovation process enables the business owners to gain new opportunities for their products to meet the fast-changing demand of the current trends and customers’ demand. Therefore, the product meets the customers’ satisfaction. Sylvana and Awaluddin (2017) described that the innovative product is to meet the market demand, thus, the product is one of the things that can be used as competitive advantages of the company[4].

By utilizing information technology in the business field, it will have a major positive impact on the business nets that build. Advances in technology and information can help companies reduce production costs so, by reducing the company's operating costs allowing optimal profit. In other words, the role of information technology development today cannot be separated from the business activities, due of the development of information technology can provide various advantages and conveniences in carrying out business activities. IT-based organizational innovation enables employees’ performance to be objectively measured. Sufficient reward for employees can be disbursed through measurable performance and similarly punishment can be made based on objective indicators. The comparison between the target and work result can be easily measured and considered more transparent as it uses information technology. For instance, through information technology enable

employees to use digital attendance, this is highly beneficial for field workers, thus, their field works will be better monitored. The daily example of this is that online transportation can provide sense of security for the driver and passengers due to the GPS technology attached to these online transportation applications. Crimes report reported to the online transportation business can be easily tracked by the police to solve.

Small business need to develop their network and or collaborate with large scale business. Thus, it will increase opportunities the occurrence of transfer of technology. For instance, many Small business nowadays market their product on online marketplace such as Lazada, Shopee or even by Facebook marketplace etc. This network could enhance their possibility to have better sales, market and market share. Dyer and Nobeoka (2000) on their qualitative research were revealed about Toyota and their knowledge sharing network between Small business partner to increased Toyota efficiency on production process, product and their financial benefit. The lesson from this statement is Small business the chance of high technology cluster to sustain will more possible[32].

Meanwhile Small business also cannot forget about their obtain network on other Small business. Even though in real business practices between Small business could act as competitor, however among Small business are not also considered as competitors but also can act as partner. For instance, cluster of Small business at Special Province of Yogyakarta made their consumer more satisfied due of the buyer order could 100 percent completed and minimize the risk of rejected order due of limited production capacities or other reasons. Among Small business could be built mutually beneficial cooperation and hand on hand operation to make customer needs. This corporation could fill the gap between underemployed or limitedness of production capacity

3.1 Research Limitation

Just like any other research, this research cannot be separated from the limitations of the study. The first limitation that could be made is research location were only concentrated in Gorontalo. This selection has a risk of generalizing the results of the study, perhaps the study could be generalized in Gorontalo, but not necessarily generalizable for other regions. Indonesia is an archipelago country that has a wide variety of cultures that are very likely to have an impact on differences in research results. Through further research it is expected to produce empirical evidence that is broader. Ideally, this research can be carried out in all provinces in Indonesia. The second limitation that can be conveyed were that the data collection time is only limited to one particular time, or it can be called the limitation of cross section. This approach has the disadvantage of capturing respondent perceptions in the post-data-collection period. Further research using longitudinal data collection is wisely can choose.

4 CONCLUSION

The conclusion is that the business competitiveness of small businesses in the high-tech field is influenced by products, processes and organizational innovation. In other words, it is strongly influenced by the uniqueness produced by small businesses, especially in Gorontalo City. The uniqueness is in the form of product results, production process and how to manage the business.

Based on that conclusion, small business must be able to create products, or product segments, and services that exceed the performance limitations of traditional products by utilizing everything possible through digital models. For instance, Small business can take advantage of the trace data that can be obtained from current consumer behavior. For example, whenever a potential customer changes the screen of a mobile device or uploads something on social media, they will leave an information trail related to their preferences and behavior. This allows business owners to understand consumer patterns and behavior beyond traditional boundaries, while knowing the facts of how their consumers interact with the online and offline world around them.

The next research can compare between Micro Enterprises, Small Businesses, and Large Businesses, and Ideally, this research can be carried out in all provinces in Indonesia.

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REFERENCES

- [1] N. F. Wuryaningrat, "Knowledge Sharing, Absorptive Capacity and Innovation Capabilities: An Empirical Study on Small and Medium Enterprises in North Sulawesi, Indonesia," *Gadjah Mada International Journal of Business*, vol. 15, no. 1, pp. 61–77, 2013, doi: 10.22146/GAMAJIB.5402.
- [2] N. Ikujiro and H. Takeuchi, *The Knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford university press, 1995.
- [3] I. Nonaka, G. Von Krogh, and S. Voelpel, "Organizational Knowledge Creation Theory: Evolutionary Paths and Future Advances," *Sage Journals*, vol. 27, no. 8, pp. 1179–1208, 2006, doi: 10.1177/0170840606066312.
- [4] A. Sylvana and M. Awaluddin, "Model Penciptaan Daya Saing Bisnis Melalui Transformasi Kewirausahaan Berbasis Teknologi Informasi (Technopreneur)," Universitas Terbuka Convention Center (UTCC), Nov. 2017, pp. 71–81. Accessed: Apr. 16, 2022. [Online]. Available: <http://ut.ac.id>
- [5] S. N. Russell and H. H. Millar, "Exploring the Relationships among Sustainable Manufacturing Practices, Business Performance and Competitive Advantage: Perspectives from a Developing Economy," *Journal of Management and Sustainability*, vol. 4, no. 3, 2014, doi: 10.5539/JMS.V4N3P37.
- [6] J. A. Johannessen, B. Olsen, and G. T. Lumpkin, "Innovation as newness: What is new, how new, and new to whom?," *European Journal of Innovation Management*, vol. 4, no. 1, pp. 20–31, 2001, doi: 10.1108/14601060110365547/FULL/XML.
- [7] M. E. Porter, *Competitive advantage of nations: creating and sustaining superior performance*. simon and schuster. 2011.
- [8] N. F. Wuryaningrat, P. Kindangen, G. Sendow, B. Lumanouw, and L. I. Kumajas, "'One Shot' Knowledge Transfer: Is It Possible? (Empirical Study on the

- Indonesian Creative Industry)," *International Journal of Innovation, Creativity and Change*. www.ijicc.net, vol. 10, no. 7, 2019.
- [9] Harjono, A. Widyatmoko, and T. Nurhidayat, "PEMBELAJARAN KEWIRAUSAHAAN POLITAMA," *Prosiding KNIT RAMP-IPB*, pp. 27–32, 2013.
 - [10] O. Suparno, A. Hermawan, M. Faiz Syuaib, E. Nugroho, and E. Anggraeni, "Peningkatan Minat Dan Kemampuan Technopreneurship Melalui Workshop Satu HarI," in *Prosiding KNIT RAMP-IPB*, 2013, pp. 131–139.
 - [11] M. N. Kiveu, M. Namusonge, and S. Muathe, "Effect of innovation on firm competitiveness: the case of manufacturing SMEs in Nairobi County, Kenya," *International Journal of Business Innovation and Research*, vol. 18, no. 3, pp. 307–327, Jan. 2019, doi: 10.1504/IJBIR.2019.098251.
 - [12] S. M. Chege and D. Wang, "The influence of technology innovation on SME performance through environmental sustainability practices in Kenya," *Technology in Society*, vol. 60, p. 101210, Feb. 2020, doi: 10.1016/j.techsoc.2019.101210.
 - [13] S. M. Chege and D. Wang, "Information technology innovation and its impact on job creation by SMEs in developing countries: an analysis of the literature review," *Technology Analysis & Strategic Management*, vol. 32, no. 3, pp. 256–271, Mar. 2020, doi: 10.1080/09537325.2019.1651263.
 - [14] H. Indrawati, Caska, and Suarman, "Barriers to technological innovations of SMEs: how to solve them?," *International Journal of Innovation Science*, vol. 12, no. 5, pp. 545–564, Jan. 2020, doi: 10.1108/IJIS-04-2020-0049.
 - [15] BPS, "Berita Resmi: Pertumbuhan Ekonomi Gorontalo 2019. No.12/02/75/Th. XIV," 2019.
 - [16] M. J. K. Stanworth and J. Curran, "Growth And The Small Firm — An Alternative View," *Journal of Management Studies*, vol. 13, no. 2, pp. 95–110, 1976, doi: 10.1111/J.1467-6486.1976.TB00527.X.
 - [17] A. Lund Vinding, "Absorptive capacity and innovative performance: A human capital approach," *Economics of Innovation and New Technology*, vol. 15, no. 4–5, pp. 507–517, 2007, doi: 10.1080/10438590500513057.
 - [18] J. Barney, "Firm Resources and Sustained Competitive Advantage," *Journal of Management*, vol. 17, no. 1, pp. 99–120, Mar. 1991, doi: 10.1177/014920639101700108.
 - [19] J. F. Hair, W. C. Black, B. J. Babin, R. E. Anderson, and U. Saddle River Boston Columbus San Francisco New York Indianapolis London Toronto Sydney Singapore Tokyo Montreal Dubai Madrid Hong Kong Mexico City Munich Paris Amsterdam Cape Town, *Multivariate Data Analysis A Global Perspective*. New Jersey: Prentice Hall, 2010.
 - [20] J. C. Nunnally, *Psychometric theory*. McGraw-Hill, 1978.
 - [21] J. F. Hair, C. M. Ringle, and M. Sarstedt, "PLS-SEM: Indeed a Silver Bullet," *Journal of Marketing Theory and Practice*, vol. 19, no. 2, pp. 139–152, 2014, doi: 10.2753/MTP1069-6679190202.
 - [22] F. Jabeur, M. Mohiuddin, and E. Karuranga, "Timeline of Initial Perceptions and Adoption of e-Business Among Quebec Forestry Sector SMEs," *Communications of the IIMA*, vol. 13, no. 3, 2014.
 - [23] N. Jones and T. Kochtanek, "Consequences of Web-based technology usage," *Online Information Review*, vol. 26, no. 4, pp. 256–264, 2002, doi: 10.1108/14684520210438697.
 - [24] L. Hermana, *Internet users are shaking the tree of science*. QUA-DERNS, 2008.
 - [25] P. E. Petrakis, P. C. Kostis, and D. G. Valsamis, "Innovation and competitiveness: Culture as a long-term strategic instrument during the European Great Recession," *Journal of Business Research*, vol. 68, no. 7, pp. 1436–1438, 2015, doi: 10.1016/J.JBUSRES.2015.01.029.
 - [26] J. Dobrovic, P. Gallo, B. Mihalcova, L. Stolfova, and P. Szaryszova, "Competitiveness Measurement in Terms of the Europe 2020 Strategy," *Journal of Competitiveness*, vol. 10, no. 4, pp. 21–37, 2018, doi: 10.7441/JOC.2018.04.02.
 - [27] G. Cappiello, F. Giordani, and M. Visentin, "Social capital and its effect on networked firm innovation and competitiveness," *Industrial Marketing Management*, vol. 89, pp. 422–430, 2020, doi: 10.1016/J.INDMARMAN.2020.03.007.
 - [28] X. Zhao and B. Sun, "The influence of Chinese environmental regulation on corporation innovation and competitiveness," *Journal of Cleaner Production*, vol. 112, pp. 1528–1536, 2016, doi: 10.1016/J.JCLEPRO.2015.05.029.
 - [29] L. Manuel, C. Farinha, J. José, M. Ferreira, J. José, and B. Gouveia, "Innovation and Competitiveness: A High-Tech Cluster Approach The Romanian Review Precision Mechanics," *Optics & Mechatronics*, no. 45, 2014.
 - [30] A. Bagheri, "The impact of entrepreneurial leadership on innovation work behavior and opportunity recognition in high-technology SMEs," *The Journal of High Technology Management Research*, vol. 28, no. 2, pp. 159–166, 2017, doi: 10.1016/J.HITECH.2017.10.003.
 - [31] L. Farinha and S. Bagchi-Sen, "Following the Footprints of SME Competitiveness in a High-Technology Sector," *Innovation, Technology and Knowledge Management*, pp. 77–95, 2018, doi: 10.1007/978-3-319-74881-8_6.
 - [32] J. H. Dyer and K. Nobeoka, "Creating and managing a high-performance knowledge-sharing network: the Toyota case," *Strategic Management Journal*, vol. 21, no. 3, pp. 345–367, 2000, doi: [https://doi.org/10.1002/\(SICI\)1097-0266\(200003\)21:3<345::AID-SMJ96>3.0.CO;2-N](https://doi.org/10.1002/(SICI)1097-0266(200003)21:3<345::AID-SMJ96>3.0.CO;2-N).

BANK NEGARA INDONESIA
KANTOR : GORONTALO

IBOC - Maintenance (S10)

Teller ID

Date

Time

: 89066

: 09/06/2022

: 11:49:00

Sender's Reference:

:20:S10CTI000002422

Bank Operation Code:

:23R:CREB

Value Date/Currency/Interbank Settled Amount:

:22A:220609USD500,

Ordering Customer:

:50K:/00000000427005017

BPK RIZAN MACHMUD

UL PROF DR HJ JOHN ARYO KATILI

GORONTALO

INDONESIA

Ordering Institution:

:52A:BNINIDJAXXX

Account With Institution:

:57D:INDUSTRIAL AND. COMERCIAL BANK

BEIJING CHINA

Beneficiary Customer:

:59:/0200296400116032240

IIETA RSMC BEIJING LTD.

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JINMAO PLAZA FENGTAI DISTRICT

BEIJING CHINA

Remittance Information:

:70:PAPER PAYMENT

PAPER INVOICE 20220607 14668

Details Of Charges:

:71A:OUR



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June 7, 2022

Rizan Machmud

Faculty of Economics,
Universitas Negeri Gorontalo,
Gorontalo City, 96128, Indonesia

Dear Rizan Machmud, Nikolas F. Wuryaningrat, Diah Mutiarasari,

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Technopreneurship-Based Competitiveness and Innovation at Small Business in Gorontalo City

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ABSTRACT

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Business today has been globalized. This has made business even more competitive. Companies, regardless of their size, have to improve their competitiveness. Sustainable competitiveness is the core need for innovation. This study aims at exploring the correlation between IT-based innovation or technopreneurship and business competitiveness. This was a quantitative study with survey method. The respondents in this study were small business owners in handicraft and creative content production in Gorontalo city. The data were collected by online form and after three month collecting data, data were collected were 163 respondents. Product, process and organizational innovation and business competitiveness instruments use instruments from previous research. All instruments use a Likert scale with points 1 to 5 which indicate a scale of disagreement to agreement from the respondents. The data were analyzed using PLS-SEM. The Results show that information technology-based product innovation, IT based process innovation, and IT organizational innovation significantly and positively influence the growth of business competitiveness. Product innovation of business owners in Gorontalo city, Indonesia is actively producing new products. Also, innovation is not only limited to product innovation but also production process innovation, which uses information technology. Utilization of technopreneurship is significantly able to increase business competitiveness, especially for small businesses in Gorontalo city. Utilization of innovation in information technology assumed to strongly develop business competitiveness. The business competitiveness of small businesses in the high-tech field is influenced by products, processes and organizational innovation. SMEs must be able to create products, or product segments, and services that exceed the performance limitations of traditional products by utilizing everything possible through digital models.

1. INTRODUCTION

Today globalized business has created a highly competitive business environment. Companies, regardless of their sizes; small- or large-scale business, have to strengthen their competitiveness. Schumpeter writes that both large and small enterprises are demanded to have entrepreneurship spirit shown through companies' innovative activities [1]. Innovation is major effort to develop and maintain the sustainability of company's competitiveness [2, 3].

Global Competitiveness Index (GCI) in 2017 and 2018 records showed that Indonesia's competitiveness decreased from the 31st position within the period of 2016-2017 to the 45th position within the period of 2017-2018. This was far behind Singapore who sits in the first rank among ASEAN countries and the second position of the world, Malaysia who sits in the second rank among ASEAN countries and 25th rank in the world, as well as Thailand who sits in the 3rd rank among ASEAN countries and globally sits on the 38th rank. In other words, enhanced innovation capabilities in Indonesia should be top priority to catch up their aperture.

The concept of competitiveness is made of competitive advantage and comparative advantage, where these two

concepts basically discuss the advantage competitiveness through business ability to shift the supply curve to gain efficient and competitive price [4]. Creating competitive good price, firm needs various strategies that correlates with production, consumption, market structure, and industrial condition concepts. Competitiveness can be developed by utilizing five components of cost, quality, flexibility, shipping, and innovation [5].

One of the most important components of those five components is innovation. Innovation could be the missing key due of through innovation it is assumed that company is able to develop fast adaptive business. Sustainable competitiveness is the core of the need for innovation [6]. Porter [7] links business competitiveness with human resource knowledge, skill, and ability. Further, he describes that competitiveness of a nation is no longer determined by its natural resources and cheap labor, rather by innovation ability from utilization of knowledge. Several researches in Indonesia have confirmed the statement. One of them were were describes that appropriate human resource through their knowledge, skill, ability and personality were fit with the need of organization, could create the culture of knowledge transfer, that culture could be very useful to increase business

innovation capabilities [8].

Innovation, among others is manifested through the ability to make business more innovative by employing appropriate information technology. In this knowledge-based economy era, entrepreneurship-based business development is the creation of ability to utilize appropriate technology to optimize business [9]. This concept is commonly known as technopreneurship. Technopreneurship is a collaboration between technology implementation an instrument and entrepreneurship as a need [4]. The technopreneurship involves two key elements, technology used by business owners to meet the customers' demand, target customers, and optimum economics, social, and environmental benefits [10].

Some of the results of previous research related to business competition, innovation, technopreneurship, small business, namely process, marketing and organisational innovations had positive significant effect on competitiveness, while product innovation had positive non-significant effect [11], Technology innovation acts as a catalysts for sustainable development [12], technology innovations influence employment creation in small businesses positively and act as a driving force for economic development [13], there are five inhibiting factors of SMEs' technology innovation: government support, quality of human resources, funding of technological innovation, economic conditions and business partners [14].

The research conducted on small business (employees below 20, based on Indonesia Central Statistic bureau criteria) on high technology cluster. Micro, small and medium enterprises according to the Law of the Republic of Indonesia number 20 of 2008 concerning micro, small and medium enterprises in Chapter I General Provisions, Article 1, namely: Micro Enterprises are productive businesses owned by individuals and/or individual business entities that meet the criteria for Micro Enterprises as regulated in this Law; Small Business is a productive economic business that stands alone, which is carried out by individuals or business entities that are not subsidiaries or not branches of companies that are owned, controlled, or become part either directly or indirectly of Medium Enterprises or Large Businesses that meet the Business criteria. Small as referred to in this Law; Medium Enterprises are productive economic businesses that stand alone, which are carried out by individuals or business entities that are not subsidiaries or branches of companies that are owned, controlled, or become a part either directly or indirectly with Small Businesses or Large Businesses with total net assets or annual sales proceeds as regulated in this Law. This approach was quite new, due of lack previous research discuss it. Majorities of previous research only involve large scale business and have adequate research and development department and strategic. Even though small business had limitedness on research and development approach, but they have high potency on national economic growth [8].

Small businesses are the majorities business at Indonesia, whose contribution to the national economy is enormous. To represent research object, the city of Gorontalo was chosen. Gorontalo City is one of emerging market in Indonesia, which is currently growing rapidly. This is evidenced by their economic growth of 6.4% in 2019 [15], higher than Indonesia's economic growth in 2019 which only reached 5.02% [15]. Mention from that official news small business in Gorontalo played an important role in supporting Gorontalo economic growth.

This study aims at exploring the correlation between IT-based innovation or technopreneurship and business competitiveness.

2. METHOD

This is a quantitative study with explanatory and survey method. In this study, the primary data were used by employing the research instrument used in pervious study with several adjustments. Instruments used in this study are validity through panel experts, which consists of academics and business owners, especially small and medium enterprises owners. The process is described as follow: instrument in English is translated into Bahasa Indonesia by competent translators. Following the translation process, the instrument is consulted to the expert panels. Upon their agreement from the expert panels, the questioner is distributed to the respondents.

Gorontalo City was chosen as the research location due of the economic development background of the city. Gorontalo City is located in Gorontalo Province, a province that is relatively new as a result of regional autonomy of its separation from North Sulawesi province. Thus, Gorontalo City is a relative new city in Indonesia. Even though it is relatively new, the economic growth rate is 6.4% above the Indonesia economic growth average which is only around 5.02% in 2019 [15]. This economic growth is supported, among other things, by the major role of SMEs creative enterprises as previously mentioned.

2.1 Population and sample

The respondent of this study is business owner of Small business. In practice, the owners of Small business play a dominant role. Hence, studying SME owners means studying the Small business themselves [16]. The specific respondents in this study are small business owners of handicrafts and creative contents (photo editing, video, and website production) in Gorontalo city, Indonesia which proportionally distributed to 500 respondents through online questionnaire (using Survey Monkey Application). The questionnaire link is sent through text message, WhatsApp, messenger, e-mail any other social media. There were 500 distributed questionnaire set, only 163 who returned the questionnaire completely filled for the period of three months (September, October, November 2019) data collection.

Table 1. Characteristic of respondent

Profile	(n = 163)	%
Sex		
Male	46	73.13
Female	17	26.86
Age Average	41,5	
Education		
Elementary school	4	5.97
Junior high school	15	23.38
Senior high school	21	33.33
Diploma	7	12.43
Bachelor	16	24.87
Positions		
Manager	15	23.38
Owner	31	49.75
Manager and owner	17	26.86

The number of samples analyzed were 163 respondents from 500 target respondents. This still meets the criteria if using the Slovin formula with a margin of error of 5%, the sample size is 222 respondents. Thus, the achievement of filling out the questionnaire is 73.43%.

Table 1 shows that for 163 respondents, the data shows that the dominance of men in business is very high. This is consistent with the basic nature of men as the backbone of the family economy. One hundred and Sixty-three (63) respondents who managed to collect data had an average age of 41.5 years or if rounded off to an average age of 42 years. Forty-two (42) years old can be considered as productive age and experienced. High school education or equivalent has the highest portion. That number shown us the possibility of a lack of innovation capabilities due to weakness in absorptive capacities [1, 17]. Then as many as 63 respondents, most of whom (49.75%) are business owners and the rest are managers who are also owners and managers / managers.

2.2 Measurement

The questionnaire was adopted from previous research, namely product, process and organizational innovation items [6] and business competitiveness [18]. All instruments use a Likert scale with points 1 to 5 which indicate a scale of disagreement to agreement from the respondents. All existing instruments are then adjusted to the object of research, which will be explained in the next section.

2.3 Face validity and content validity

In implementing face validity in this study, it applies 5 steps. The first step begins by adopting research instruments that already had been used by other researchers. Instruments preferably use original instruments or those from the original researcher that match the definition and indicators. The second step, namely translating English into Indonesian using back-to-back method, this step involves the professional language institute. This step is important because English words have many meanings and the translation must be adjusted to the context of the study so that the original meaning and meaning of the instrument is not misperceived by the respondent. The third step is to consult with academics regarding instruments that have been translated according to the research context and suitable for use by the object of research. Academics involved include academics from Gorontalo State University, Sam

Ratulangi University and Manado State University which have adequate competences in the creative industry of Small business. An important result of the consultation was an agreement to change the words in the instrument "I" to "we", in order to reduce bias in answering statements. The word "we" is considered more suitable for identifying respondents to represent the organization than the word "I" which is more likely to answer based on personal feelings rather than organization.

2.4 Convergent validity and reliability tests

Even though the instrument has been tested by the panel experts for its appropriateness to collect the data, and using instrument from previous research, to convinced statistical validity and reliability test were still carried out. Convergent validity test of Average Variance Extracted (AVE) score higher than 0.5 is considered reasonable to measure validity [19]. Cronbach alpha score above 0.6 were acceptable even score higher than 0.7 is considered ideal number [20]. The result of the convergent validity and reliability test is presented in Table 2.

Information was showed on Table 2 explained that item statement x5 and y4 must be dropped due they only reach below 0.5 of factor loading and made AVE score on its constructs also lower than 0.5. After treatment on the problem, all the constructs reached acceptable score. In other word convergent validity as seen in Table 2 well acceptable. In Table 2 also showed that reliabilities the constructs were reach ideal number, which higher than 0.7. Thus, from Table 2 it can be concluded that statistic validity and reliability had qualify to be proceed to hypothesis test.

2.5 Data analysis

Data analysis technique PLS-SEM were used support that statement. Collected data were analyzed using PLS-SEM model of SmartPLS 2.0M3 software. This technique was employed as the research model is inter-dimensional. Thus, the PLS-SM was an appropriate approach to anticipate this. Further, with only 163 respondents, PLS-SEM was a wise option for data analysis. PLS-SEM is a data analysis technique to produce powerful statistical result regardless of the small size sample [19]. PLS-SEM, if appropriately applied, is indeed a "silver bullet" for estimating causal models in many theoretical models and empirical data situations [21].

Table 2. Convergent validity and reliability test

Dimension	Instrument	AVE Value	Cronbach alpha
IT Product Innovation	x1. Within the last three years we have created new products using relatively new technology	0.513	0.742
	x2. Within the last three years we have created new product design employing technology		
	X3. Our product components use new components		
IT Process Innovation	x4. Within the last three years our production has been carried out using new production method	0.529	0.762
IT Organizational Innovation	x5. Within the last three years, we have accepted new method of payment *	0.551	0.771
	x6. Within the last three years we have used technology application to appraise employees' performance.		
Business competitiveness	y1. We are able to create products with affordable price	0.552	0.713
	y2. We are able to suppress our production cost efficiently		
	y3. We are able to create products that cannot be easily copied by our competitors		
	y4. We created products that are different from our competitors' *		

*drop item

3. RESULTS & DISCUSSION

After the validity and reliability tests successfully executed. Following the validity and reliability tests, the analysis of the data is carried out using the SmartPLS 2.0 M3 application. The result is presented in Table 3 below.

Table 3 showed that information technology-based product innovation, IT based process innovation, and IT organizational innovation significantly and positively influence the growth of business competitiveness. This is empirical evident in all the T-stat values that are above 1.960 [19]. Therefore, it can be concluded that all of hypothesis accepted. That result means that utilization of technopreneurship is significantly able to increase business competitiveness, especially for small businesses in Gorontalo city. In other words, the hypothesis suggested before were proven and accepted.

This result backs up Jabeur and Karuranga [22] research who described that current business environment demands business owners to quickly adapt to the changes to use Information technology to remain competitive. Utilization of technology has impact on the increase of performance, including time efficiency and better decision-making [23]. Organizational innovation practices through utilization of information technology is closely related with improvement of productivity and rapid innovation [24].

Using the data of European Union countries Petrakis et al. [25] revealed that business competitiveness highly dependent on innovation culture as long-term strategic instrument. Dobrovic et al. (2018) were considered the same result, they convinced that innovation and business competitiveness were highly related and present the level of competitiveness on European [26].

Good policy has repeatedly encouraged competitiveness not just at the level of firm but also regional levels, as well as foster innovation and new product development [27, 28]. On the cluster of Small business, the level of innovation is indispensable to compete on high-tech and highly competition [29]. There were findings suggest a significant impact of entrepreneurial leadership on innovation work behavior and opportunity recognition of employees in the high-tech Small business [30]. From this information the lesson learned were innovation has high role in the competitiveness of Small business and network to enhancing the function of a high-technology Small business cluster [31]. In other words, innovation and business competitiveness could be footprint on Small business development and sustainability.

Product innovation of business owners in Gorontalo city, Indonesia is actively producing new products. Also, innovation is not only limited to product innovation but also production process innovation, which uses information technology. One of these innovations is by changing the product design to make it hard for the competitors to copy the product and create different products. The developed innovation process enables the business owners to gain new opportunities for their products to meet the fast-changing demand of the current trends and customers' demand.

Therefore, the product meets the customers' satisfaction. Sylvana and Awaluddin [4] described that the innovative product is to meet the market demand, thus, the product is one of the things that can be used as competitive advantages of the company.

By utilizing information technology in the business field, it will have a major positive impact on the business nets that build. Advances in technology and information can help companies reduce production costs so, by reducing the company's operating costs allowing optimal profit. In other words, the role of information technology development today cannot be separated from the business activities, due of the development of information technology can provide various advantages and conveniences in carrying out business activities. IT-based organizational innovation enables employees' performance to be objectively measured. Sufficient reward for employees can be disbursed through measurable performance and similarly punishment can be made based on objective indicators. The comparison between the target and work result can be easily measured and considered more transparent as it uses information technology. For instance, through information technology enable employees to use digital attendance, this is highly beneficial for field workers, thus, their field works will be better monitored. The daily example of this is that online transportation can provide sense of security for the driver and passengers due to the GPS technology attached to these online transportation applications. Crimes report reported to the online transportation business can be easily tracked by the police to solve.

Small business need to develop their network and or collaborate with large scale business. Thus, it will increase opportunities the occurrence of transfer of technology. For instance, many Small business nowadays market their product on online marketplace such as Lazada, Shopee or even by Facebook marketplace etc. This network could enhance their possibility to have better sales, market and market share. Dyer and Nobeoka [32] on their qualitative research were revealed about Toyota and their knowledge sharing network between Small business partner to increased Toyota efficiency on production process, product and their financial benefit. The lesson from this statement is Small business the chance of high technology cluster to sustain will more possible.

Meanwhile Small business also cannot forget about their obtain network on other Small business. Even though in real business practices between Small business could act as competitor, however among Small business are not also considered as competitors but also can act as partner. For instance, cluster of Small business at Special Province of Yogyakarta made their consumer more satisfied due of the buyer order could 100 percent completed and minimize the risk of rejected order due of limited production capacities or other reasons. Among Small business could be built mutually beneficial cooperation and hand on hand operation to make customer needs. This corporation could fill the gap between underemployed or limitedness of production capacity.

Table 3. Hypothesis test

	Original Sample (O)	Deviation Standard	T-stat Value	Remarks
IT Product innovation à competitiveness	0.374	0.172	2.179	Significant
IT process innovation à competitiveness	0.752	0.099	7.67	Significant
IT organizational innovation à competitiveness	0.289	0.094	3.094	Significant

* Smart PLS-SEM Data Report, 2019.

3.1 Research limitation

Just like any other research, this research cannot be separated from the limitations of the study. The first limitation that could be made is research location were only concentrated in Gorontalo. This selection has a risk of generalizing the results of the study, perhaps the study could be generalized in Gorontalo, but not necessarily generalizable for other regions. Indonesia is an archipelago country that has a wide variety of cultures that are very likely to have an impact on differences in research results. Through further research it is expected to produce empirical evidence that is broader. Ideally, this research can be carried out in all provinces in Indonesia. The second limitation that can be conveyed were that the data collection time is only limited to one particular time, or it can be called the limitation of cross section. This approach has the disadvantage of capturing respondent perceptions in the post-data-collection period. Further research using longitudinal data collection is wisely can choose.

4. CONCLUSION

The conclusion is that the business competitiveness of small businesses in the high-tech field is influenced by products, processes and organizational innovation. In other words, it is strongly influenced by the uniqueness produced by small businesses, especially in Gorontalo City. The uniqueness is in the form of product results, production process and how to manage the business.

Based on that conclusion, small business must be able to create products, or product segments, and services that exceed the performance limitations of traditional products by utilizing everything possible through digital models. For instance, Small business can take advantage of the trace data that can be obtained from current consumer behavior. For example, whenever a potential customer changes the screen of a mobile device or uploads something on social media, they will leave an information trail related to their preferences and behavior. This allows business owners to understand consumer patterns and behavior beyond traditional boundaries, while knowing the facts of how their consumers interact with the online and offline world around them.

The next research can compare between Micro Enterprises, Small Businesses, and Large Businesses, and Ideally, this research can be carried out in all provinces in Indonesia.

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REFERENCES

[1] Wuryaningrat, N.F. (2013). Knowledge sharing, absorptive capacity and innovation capabilities: An empirical study on small and medium enterprises in North Sulawesi, Indonesia. *Gadjah Mada International Journal of Business*, 15(1): 61-77. <https://doi.org/10.22146/GAMAJB.5402>

[2] Nonaka, I., Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.

[3] Nonaka, I., Von Krogh, G., Voelpel, S. (2006). Organizational knowledge creation theory: Evolutionary paths and future advances. *Organization Studies*, 27(8): 1179-1208. <https://doi.org/10.1177/0170840606066312>

[4] Sylvana, A., Awaluddin, M. (2017). Model Penciptaan Daya Saing Bisnis Melalui Transformasi Kewirausahaan Berbasis Teknologi Informasi (Technopreneur). *Entrepreneurship at Global Crossroad: Challenges and Solutions*, 71-81. <http://ut.ac.id>, accessed on Apr. 16, 2022.

[5] Russell, S.N., Millar, H.H. (2014). Exploring the relationships among sustainable manufacturing practices, business performance and competitive advantage: Perspectives from a developing economy. *J. Mgmt. & Sustainability*, 4: 37. <https://doi.org/10.5539/JMS.V4N3P37>

[6] Johannessen, J.A., Olsen, B., Lumpkin, G.T. (2001). Innovation as newness: what is new, how new, and new to whom? *European Journal of Innovation Management*, 4(1): 20-31. <https://doi.org/10.1108/14601060110365547/FULL/XML>

[7] Porter, M. E. (2011). *Competitive advantage of nations: creating and sustaining superior performance*. Simon and Schuster.

[8] Wuryaningrat, N.F., Kindangen, P., Sendow, G., Lumanouw, B., Kumajas, L.I. (2019). One shot" knowledge transfer: Is it possible?(Empirical study on the Indonesian creative industry). *International Journal of Innovation, Creativity and Change*, 10(7): 363-385. https://www.ijicc.net/images/vol10iss7/10724_Wuryaningrat_2019_E_R1.pdf.

[9] Harjono, A. W., Nurhidayat, T. (2013). *Pembelajaran Kewirausahaan Politama*. Prosiding KNIT RAMP-IPB, 27-32.

[10] Suparno, O., Hermawan, A., Syuaib, M.F., Nugroho, E., Anggraeni, E. (2013). *Peningkatan Minat Dan Kemampuan Technopreneurship Melalui Workshop Satu Hari*. Konferensi Nasional Inovasi Dan Technopreneurship, pp. 131-139.

[11] Kiveu, M.N., Namusonge, M., Muathe, S. (2019). Effect of innovation on firm competitiveness: The case of manufacturing SMEs in Nairobi County, Kenya. *International Journal of Business Innovation and Research*, 18(3): 307-327. <https://doi.org/10.1504/IJBIR.2019.098251>

[12] Chege, S.M., Wang, D. (2020). The influence of technology innovation on SME performance through environmental sustainability practices in Kenya. *Technology in Society*, 60: 101210. <https://doi.org/10.1016/j.techsoc.2019.101210>

[13] Chege, S.M., Wang, D. (2020). Information technology innovation and its impact on job creation by SMEs in developing countries: An analysis of the literature review. *Technology Analysis & Strategic Management*, 32(3): 256-271. <https://doi.org/10.1080/09537325.2019.1651263>

[14] Indrawati, H. (2020). Barriers to technological innovations of SMEs: how to solve them? *International*

- Journal of Innovation Science, 12(5): 545-564. <https://doi.org/10.1108/IJIS-04-2020-0049>
- [15] Statistik, B.P. (2014). Pertumbuhan ekonomi Indonesia. Berita Resmi Statistik, 17(16/02): 1-9.
- [16] Stanworth, M.J.K., Curran, J. (1976). Growth and the small firm—an alternative view. Journal of Management Studies, 13(2): 95-110. <https://doi.org/10.1111/J.1467-6486.1976.TB00527.X>
- [17] Lund Vinding, A. (2006). Absorptive capacity and innovative performance: A human capital approach. Economics of Innovation and New Technology, 15(4-5): 507-517. <https://doi.org/10.1080/10438590500513057>
- [18] Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1): 99-120. <https://doi.org/10.1177/014920639101700108>
- [19] Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. Saddle river boston columbus san francisco new york indianapolis london toronto sydney singapore tokyo montreal dubai madrid hong kong mexico city munich paris amsterdam cape town, U. Multivariate Data Analysis a Global Perspective.
- [20] Nunnally, J.C. (1978). Psychometric Theory McGraw-Hill Book Company. INC New York.
- [21] Hair, J. F., Ringle, C.M., Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. Journal of Marketing Theory and Practice, 19(2): 139-152. <https://doi.org/10.2753/MTP1069-6679190202>
- [22] Jabeur, F., Mohiuddin, M., Karuranga, E. (2013). Timeline of initial perceptions and adoption of e-business among Quebec forestry sector SMEs. Communications of the IIMA, 13(3): 1.
- [23] Jones, N., Kochtanek, T. (2002). Consequences of web-based technology usage. Online Information Review, 26(4): 256-264. <https://doi.org/10.1108/14684520210438697>
- [24] Hermans, L.A.F. (2008). Internet users are shaking the tree of science. QUA-DERNS.
- [25] Petrakis, P.E., Kostis, P.C., Valsamis, D.G. (2015). Innovation and competitiveness: Culture as a long-term strategic instrument during the European Great Recession. Journal of Business Research, 68(7): 1436-1438. <https://doi.org/10.1016/J.JBUSRES.2015.01.029>
- [26] Dobrovic, J., Gallo, P., Mihalcova, B., Stofova, L., Szaryszova, P. (2018). Competitiveness measurement in terms of the Europe 2020 strategy. Journal of Competitiveness, 10(4): 21-37. <https://doi.org/10.7441/JOC.2018.04.02>
- [27] Cappiello, G., Giordani, F., Visentin, M. (2020). Social capital and its effect on networked firm innovation and competitiveness. Industrial Marketing Management, 89: 422-430. <https://doi.org/10.1016/J.INDMARMAN.2020.03.007>
- [28] Zhao, X., Sun, B. (2016). The influence of Chinese environmental regulation on corporation innovation and competitiveness. Journal of Cleaner Production, 112: 1528-1536. <https://doi.org/10.1016/J.JCLEPRO.2015.05.029>
- [29] do Carmo Farinha, L.M., de Matos Ferreira, J.J., Gouveia, J.J.B. (2014). Innovation and competitiveness: A high-tech cluster approach. Romanian Review Precision Mechanics, Optics & Mechatronics, (45): 41. <https://www.incdmtm.ro/editura/documente/Pag%2041-49.pdf>.
- [30] Bagheri, A. (2017). The impact of entrepreneurial leadership on innovation work behavior and opportunity recognition in high-technology SMEs. The Journal of High Technology Management Research, 28(2): 159-166. <https://doi.org/10.1016/J.HITECH.2017.10.003>
- [31] Farinha, L., Bagchi-Sen, S. (2019). Following the footprints of SME competitiveness in a high-technology sector. In Knowledge, Innovation and Sustainable Development in Organizations, pp. 77-95. https://doi.org/10.1007/978-3-319-74881-8_6
- [32] Dyer, J.H., Nobeoka, K. (2000). Creating and managing a high-performance knowledge - sharing network: The Toyota case. Strategic Management Journal, 21(3): 345-367. [https://doi.org/10.1002/\(SICI\)1097-0266\(200003\)21:3<345::AID-SMJ96>3.0.CO;2-N](https://doi.org/10.1002/(SICI)1097-0266(200003)21:3<345::AID-SMJ96>3.0.CO;2-N)