

ANALYSIS OF THE INTERNAL EFFECTS OF HEALTH AND PRODUCTIVITY MANAGEMENT IN JAPAN

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ABSTRACT

This study examines three potential internal effects of original health and productivity management in Japan in a super-aged society. Certified and non-certified companies were compared by means of the Superior Health and Productivity Management Corporation 2018 award, which is the solution recommended by the Ministry of Economy, Trade and Industry (METI). Additionally, an interview was conducted with a representative of the certified company FUJITSU GENERAL LIMITED. The research showed that only improved motivation was shown to be associated with a health-informed management strategy. Internal effects were not affected by health investment or the duration of the period of health investment. However, there was a correlation between increased medical expenses and increased motivation. These not only represent the first results in Japan, but are important both in Japan and in an ageing world.

KEY WORDS

Health and productivity management, internal effects, medical expense, improved productivity, turnover.

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Introduction

In business management, people, goods, money, and information represent important resources (Porter, 2003) and promotion of worker health is highlighted in the scientific management method (Taylor, 1997). However, the theory of human relations (Mayo, 1977) assumes that productivity, the mainstay of business management, contributes to human relationships to a greater extent than conditions such as breaks and the environment do. Research on productivity has typically been separated from research on physical condition management, the latter of which includes

employee health and self-care, and the work environment, including breaks.

However, Robert Rosen (1992) introduced "The Healthy Company," which presented "an approach to integrating business management and health management that has been traditionally divided." For the first time, the concept of "health and productivity management" was proposed. Subsequently, in the United States, the American College of Occupational and Environmental Medicine (ACOEM) established the Corporate Health and Achievement Awards (CHAA) program in 1996

that considers the health, safety, and work environment of employees, commenced. In 2019, ACOEM updated and redesigned the award, changing its name to the Excellence in Corporate Health Achievement Award (eCHAA). The European Network for Workplace Health Promotion (ENWHP, 2009) prioritises fostering well-being and mental health in European workplaces. In contrast, a report by a British private health insurance provider (BUPA, 2009) paints a bleak picture of workforce health in the future. One could infer that this prediction applies globally, with current workforce health patterns being most pronounced in North America, Europe, and Japan, and spreading globally. Indeed, only a minority of global companies have adopted a health promotion approach. There remain many companies, especially in developing countries and among smaller employers, which have not yet implemented basic occupational health and safety services (Jamison et al., 2006).

In Japan, interest in this topic has increased since the non-profit organisation Kenkokeiei was established in 2006. In 2008, The Ministry of Economy, Trade and Industry (METI) proposed the (tentatively named) notion of health accounting. METI published the “Health and Productivity Management Brand (2015a)” in collaboration with the Tokyo Stock Exchange. In 2017, METI and the NIPPON KENKO KAIGI organisation co-sponsored the “Superior Health and Productivity Management Corporation” (Ministry of Economy, Trade and Industry, 2017) certification (large-scale corporate division, and small and medium-sized corporate division). As a result, the term “health and productivity management” is widely used in Japan.

According to METI’s website, “health and productivity management” refers to “considering the health management of employees from a management perspective

and practicing it strategically.” According to this corporate philosophy and strategy, investing in employee health is expected to bring vitality to employees and increase the value of an organisation, namely by increasing productivity and consequently generating higher performance and stock prices.

The Japanese government considers health and productivity management to be one solution to the problems associated with a super-aged society, which is a state Japan is advancing towards (Cabinet Office, 2012). Therefore, this study assesses the influence of health and productivity management on an improvement in productivity in terms of internal effects, improved productivity, medical expense reduction, and an improvement in motivation. A similar study was conducted worldwide as Health Management., which represents the first such analysis in Japan. Specifically, this study compared companies certified as Superior Health and Productivity Management Corporations 2018 by METI with non-certified companies. This is important, not only in Japan, but also in an ageing world.

In the following sections we will analyse health and productivity management initiatives as a solution in Japan, the world’s most advanced super-ageing society.

1. Literature review

Empirical research on the effects of health and productivity management was first conducted outside Japan. In Europe, 600 million working days are lost due to work-related illness (Buck Consultants, 2008). In the United States, Loeppke et al., (2009) assessed the health status (chronic illness), absenteeism, and presenteeism (i.e. poor performance due to poor physical condition while working) of employees, and identified the consequences in terms of lost productivity. Kizzy et al.

(2008) found that low levels of employee satisfaction and high turnover could be addressed by improving motivation. Baicker et al. (2010) investigated the relationship between productivity improvement and reduced medical costs; medical costs fell by approximately \$3.27 for every dollar spent on workplace wellness programmes. In addition, the performance of US CHAA companies, such as the DaimlerChrysler corporation (2005), Caterpillar (2007) and Johnson & Johnson (2012), were assessed over a 13-year period by comparing their stock prices with the US S&P 500 index.

The stock prices of CHAA companies demonstrated a 1.8 times greater increase than did the S&P 500 (Fabius et al., 2013).

The Japanese METI lists five expected effects of health and productivity management (Kaelam and Chiba, 2011): productivity improvement, medical expense reduction, increased motivation, improved corporate image, and improved recruitment. Table 1 shows the five expected effects of "Health and Productivity Management," classified from a business management perspective.

Table 1. Five expected effects of health and productivity management

Internal effects			External effects	
Improved productivity	Medical expense reduction	Increased motivation	Image	Enhanced recruitment
Fewer sick days taken	Long-term reduction of medical costs	Improved loyalty and morale, including of employees' families	Brand value improvement	Favourable for hiring, better position in popularity rankings
Eliminated presenteeism	Decreased payment of illness-related benefits through illness prevention		Improved corporate value through rising stock prices	

Source: Kaelam and Chiba, 2011.

The issue of productivity loss in Japan was discovered in a University of Tokyo WG report (2015). According to a report by the Denso Health Insurance Association in 2013, "The loss of productivity due to sick employees who were absent from work was 860 million yen a year, while the loss of productivity due to mild unhealthy conditions such as back pain and insomnia was 20 billion yen a year" (Hoken Co., Ltd., 2013).

The effect of improved company image on their perceived value has been demonstrated among large-scale corporations, such as Superior Health and Productivity Management Corporation 2017-certified corporations, and other corporations as well (Arai et al., 2019a). In addition, Arai et al. (2019b) verified that improved image enhanced recruitment, which represents an "external" effect. However, the effects

of improved image on productivity, medical expenses, and motivation, which represent "internal" effects, have not been demonstrated. This is because the internal effects of health investment returns cannot be verified without using data that is typically private and only made available by companies, such as medical expenses, absenteeism rates, and turnover rates. That is, while there are studies on external effects related to health and productivity management, there are few empirical analyses of internal effects in Japan. Since 2015, METI has conducted the Health and Productivity Management Survey (METI, 2015b) and has made the results available to research institutions since the end of 2018. This survey is used to certify companies as Superior Health and Productivity Management Corporations. This current study considered the three internal effects

within companies that responded to the 2018 survey and that allowed response data to be shared for research directed toward promoting health and productivity management. Furthermore, health invest-

ment and years of initiative were also considered in the survey, such that an empirical analysis of five items was conducted. The five items assessed in this study are shown in Table 2.

Table 2. Internal effects and potential influence

Expected Effects		Associated Variables
Internal effects	Improved productivity	Absence rate (Alternative: sick day rate indicator)
	Reduced medical expenses	Medical expenses per person
	Increased motivation	Turnover
	Health investment	Invested amount per person
Influence of internal effects	Period of health and productivity management	Year initiated

Source: Own elaboration based on Kaelam and Chiba, 2011.

In addition, an interview was conducted with a representative of Fujitsu General Limited, a listed company that was certified as a Superior Health and Productivity Management Corporation in 2018 (METI et al., 2018).

2. Methods

T-tests and multiple regression analyses were used. SPSS was used for analysis.

Hypotheses

The following hypotheses have been formulated:

Hypothesis H1: Health and productivity management is associated with reduced medical expenses, absence rate, and turnover rate.

Hypothesis 1 will be supported if the Superior Health and Productivity Management Corporation 2018 companies have lower absence rates, medical expenses, and turnover, which represent the internal effects, than non-certified companies. In addition, t-tests were used to verify that health investment, which was presumed to influence the internal effects, was larger among certified companies than among non-certified companies, and that the period of time during which companies en-

gaged in health and productivity management was long and significant.

Average = $\sum X/N$

X = absence rates, medical expenses, turnover, amount invested per person (Yen), Period.

N = the number of companies. The average number of certified companies is less than or greater than the average of non-certified companies.

This would represent the first time these effects have been verified within Japan.

Hypothesis H2: The longer the duration (years) of health and productivity management and the greater the expenditure per employee, the more pronounced the internal effects.

This hypothesis addressed health investment returns, based on overseas studies (Astrella, 2017; Baicker et al., 2010). The effect of the duration of intervention has previously been studied by our team (Arai et al., 2019a). Hypothesis 2 will be supported if, among listed companies, years engaged in health and productivity management and health investment, which were presumed to influence internal effects,

were associated with decreased absence rate, medical expenses, and turnover.

$$Y = \alpha X_1 + \beta X_2$$

Y = Explanatory variables are Absence Rate, Medical expenses per person, and Turnover.

X = Independent variables are period of health and productivity management strategy and amount invested per person. Negatives were expected for period and amount invested per person, respectively.

Hypothesis H3: Engaging in health and productivity management improves loyalty to companies (turnover rate) and has a positive effect on other internal variables such as medical expenses per person and absence rates.

Hypothesis 3 examines the turnover rate, which is a proxy for loyalty, as securing human resources is a very high priority in business management in Japan (Imperial Data Bank, 2019), where labour is scarce. Hypothesis 3 will be verified if decreased turnover is observed among the companies certified as Superior Health and Productivity Management Corporations 2018.

$Y = \alpha X_1 + \beta X_2$ Y = the explanatory variable is Turnover.

X = Independent variables were Absence Rate, Medical expenses per person, and ...?

Turnover is expected to be positive for Absence Rate and Medical expenses per

person as in previous studies (Kizzy and Lisa, 2008).

Target companies

We used data from the 2018 Health and Productivity Management Survey, as provided by METI (METI, 2018). The summary of the 2018 Health and Productivity Management Survey was conducted from September to October 2017. It targets 3676 Japanese listed companies and unlisted companies that responded to the survey the previous year. On 20 February 2018, the Large Health section of the Superior Health and Productivity Management Corporation 2018 Comparisons was certified. Companies assessed were those certified as among the Superior Health and Productivity Management Corporations in 2018. Of the 1239 companies that responded to the survey, 718 listed companies and 521 affiliated companies provided data and 905 companies permitted the provision of data to research institutions. Of the 1239 companies, the subsidiaries were grouped into one group, such as the parent company or HD, and 539 companies with the highest score in the top 50% were certified.

Of the 718 listed companies, 474 companies were given permission to provide information to research institutions. Of the 474 companies, we compared 256 that were designated as Superior Health and Productivity Management Corporations in 2018 with the 218 that did not achieve this certification.

Table 3. Number of companies awarded the Superior Health and Productivity Management Corporation 2018 designation and non-certified companies

Coverage	All 3676 listed companies and other respondents from the previous year	
Responses	1239	Listed companies: 718
Companies which permitted the provision of data to research institutions.	905	Listed companies: 474
Companies awarded the Superior Health and Productivity Management Corporation 2018	539	Listed companies: 256 (non-certified: 218)

Source: Own elaboration.

Fujitsu General Limited was a company for which it was estimated that changes due to adopting this strategy would be easy to measure. The Health and Productivity Management Promotion Office at this company was launched in April 2017 to develop a health and productivity management strategy. Prior to the existence of this office, almost no effort was directed toward health and productivity management. This company was certified as a Superior Health and Productivity Manage-

ment Corporation 2018, and is a company with excellent management. On 9 January 2020, we interviewed the company's representative, Mitsuhiro Sato, General Manager of the Health Productivity Management Promotion Division, to obtain additional information for this study. This information concerned absence rate, medical expenses per person, and turnover, which was private information from 2016 to 2018. The company profile of Fujitsu General Limited is detailed in Table 4.

Table 4. Details of the interview with Fujitsu General Limited

Company Name	Fujitsu General Limited
Date established	15 January 1936
Sales*	252,667 million yen
Operating income	14,589 million yen
Employees*	7817
Business description	Development, manufacturing, sales and service of products and parts in the fields of HVAC and information and communication
Superior Health and Productivity Management Corporation, calendar years	2018, 2019, 2020
Health and productivity management initiation date	2017/4
Interview date	9 January 2020
Representative interviewed	Health Productivity Management Promotion Division General Manager Mitsuhiro Sato

*Sales and operating income are consolidated for FY2019/3. **As of the end of March 2019.

Source: Fujitsu General Limited HP(2020).

3. Results

T-tests and multiple regression analyses were performed to compare the data of 256 companies designated as Superior Health and Productivity Management Corporations in 2018 with 218 uncertified com-

panies. Tests of Hypothesis 1 are detailed in Table 5. Average values and significance of differences are shown for the items that were of relevance to this hypothesis.

Table 5. T-tests of companies awarded the Superior Health and Productivity Management Corporation designation in 2018 and non-certified companies

Designated as a Superior Health and Productivity Management Corporation 2018	Yes (n=256)	No (n=218)	P
	Average	Average	
Absence Rate	1.67%	1.59%	0.454
Medical expenses per person (Yen)	269,119.21	248,909.94	0.002*
Turnover	3.74%	4.24%	0.203
Amount invested per person (Yen)	28,366.89	28,098.96	0.964
Period	5.11	2.89	0.001*

Note: p-values are from t-tests. *p < 0.05.

Source: Own elaboration.

In the top three columns of Table 5, in terms of the internal effects, the average absence rate and medical expenses per person were higher and the turnover rate was lower among certified companies than non-certified companies. However, the only significant difference was in medical expenses; thus, Hypothesis 1 was not supported.

In the lower two columns, in terms of items that were presumed to influence the internal effects, the average amount invested per person was higher among certified than non-certified companies, although the difference was not significant. The number of years engaged in health and

productivity management strategy was significantly longer among certified companies than non-certified companies. One should note that only one of the two tests supported Hypothesis 1. **Thus, Hypothesis H1 was not supported overall.**

Next, as a test of Hypothesis 2, we analysed the data of the 474 listed companies by conducting separate multiple linear regressions with dependent variables of absence rate, medical expenses per person, and turnover. In each regression, the independent variables were period of health and productivity management strategy and amount invested per person (Table 6).

Table 6. Multiple linear regression analysis results predicting internal effects from period and amount invested per person (n = 474)

Internal effects	Absence Rate	Medical expenses per person	Turnover
Adjusted R ²	0.002	0.001	0.005
Intercept	0.017	257290.221	0.040
Coefficient			
Period	1.290E-5	-0.007	0.000
Amount invested per person	-1.433E-8	669.439	3.983E-8

Source: Own elaboration.

Period of health and productivity management strategy and amount invested per person did not affect the absence ratio, medical expenses per person, or turnover rate. **No result supporting Hypothesis H2 was obtained.**

In addition, in order to test Hypothesis H3 for the 256 certified companies, a regression was assessed that predicted

turnover from the absence rate and medical expenses per person. The results of the multiple regression analysis are presented in Table 7. The relationship between turnover rate and medical expenses per person was significantly negative, supporting the hypothesis. But turnover did not affect the absence rate. **Hypothesis H3 was partially supported.**

Table 7. Multiple regression analysis of turnover

Certified companies (n= 256)	
Adjusted R ²	0.068
Intercept	0.075
Coefficient	
Absence rate	0.350
Medical expenses per person	-1.615E-7*

Note: *p < 0.05.

Source: Own elaboration.

The results of the interview with Mitsuhiro Sato, the representative of Fujitsu General Limited, were transcribed as follows (see also Table 8): “We started working on health and productivity management as a strategy in April 2017. Absence rates and medical expenses per person have risen, and turnover peaked in 2017 and declined thereafter. As a result of interviews, regular medical checkups of 100% of personnel were conducted in the 2017 fiscal year, and an occupational physician dedicated

to mental health was appointed. Many people with illnesses, especially mental illness, were found, and the number of employees who left the company increased. Compared to 2017 and earlier, if an employee experienced mental health problems, the situation was considered serious and the employee was not allowed to return to work and was forced to retire. But, since 2017, interviews with the occupational physician have enabled the early detection of mental illness and so forth”.

Table 8. Fujitsu General Limited, absences, medical expenses, and turnover, 2016-2018.

Absence rate	0.99%	1.10%	2.05%
Medical expenses per person	244,772 YEN	277,116 YEN	279,637 YEN
Turnover	1.06%	2.20%	1.86%

Source: Fujitsu General Limited interview, 2020.

Health Productivity Management Promotion Division General Manager Mitsuhiro Sato said that he took leave for mild symptoms of stress and found it was easy to return to work afterwards. The ability to take leave for mental health issues and return to work thereafter has reduced the number of retirees. In addition, medical expenses per person have been increasing, which is consistent with the decrease in the number of new graduates recruited and the increase in the average age of employees. However, expenses are expected to remain stable after 2019.

4. Discussion

The first result was that, as shown in Table 5, the average absence rate and medical expenses per person were higher among the Superior Health and Productivity Management Corporation 2018 companies than among the non-certified companies; the difference in terms of medical expenses per person was significant. Therefore, Hypothesis H1 was not supported.

One criterion for certification as a Superior Health and Productivity Management

Corporation 2018 was that a 100% health check-up rate must have been achieved. As such, certified companies were expected to have greater medical expenses than non-certified companies due to the costs associated with health check-ups and any necessary medical treatments. This was suggested in a previous study (Arai et al., 2019a), and further supplemented by information obtained in the interview with the representative of Fujitsu General Limited. The number of employees who took leave (absence rate) due to the early detection of illness via the health check-ups was greater among the Superior Health and Productivity Management Corporation 2018 companies when compared to non-certified companies. Although the difference in absences was not statistically significant, a similar effect of certification was suggested through the interviews with Fujitsu General Limited.

The average turnover rate among the Superior Health and Productivity Management Corporation 2018 companies was lower than among the non-certified

companies, supporting Hypothesis H1. In contrast to the current study, studies outside Japan have revealed that a higher absence rate is typically associated with a higher turnover rate (Porter, et al., 2016). In some countries, the population is increasing and it is easy to find employees; as such, management is relatively willing to lay off employees. However, Japan has an unprecedented shortage of workers and dismissal is not legally easy. We suggest that the absence rate was relatively high among certified companies because employees were taking leave for medical treatment, with the caveat that the difference was not statistically significant. The Superior Health and Productivity Management Corporation 2018 companies have been working to improve work-life balance and have facilitated returning to work after receiving treatment for poor mental health. The interview with Fujitsu General Limited also highlighted a trend toward an increasing number of employees receiving treatment for mental health issues and a consequent decrease in the turnover rate due to illness. Enhanced wellness support for employees is an essential component of health and productivity management.

The Superior Health and Productivity Management Corporation 2018 companies tended to have invested a greater monetary sum per person than the non-certified companies and to have spent a longer period of time engaged in health-informed management strategy. Although the difference in expenditure was not statistically significant, we infer that the Superior Health and Productivity Management Corporation 2018 companies were operating effectively.

Hypothesis H2 proposed that the years engaged in management strategy and the amount invested per person would affect the absence rate, medical expenses, and turnover rate. Accordingly, multiple linear

regression analysis was performed. The results obtained did not support Hypothesis H2.

There are three possible reasons for the difference between the current results and those reported from outside Japan. Firstly, Japanese companies have adopted health-informed management strategies for a short period of time, with relatively small investment, which may be insufficient to produce internal effects. Secondly, in previous studies in Japan (Arai et al., 2019b), health investment was only reflected in external effects (i.e., image and recruitment); it is possible that investment only drives external effects. Thirdly, this study faces the issue of using proxy indicators of improved productivity and increased motivation. In a Newsweek article (Kaelam and Chiba, 2011) referenced by METI, absenteeism and presentism were used as proxies for productivity improvement and royalties were used as a proxy for increased motivation. This is because there are no items that directly assess productivity and motivation in the 2018 Health and Productivity Management Survey.

In the survey, there are many kinds of measurement of presenteeism, and it is not possible to narrow it down to one result, as only two formulas are illustrated. Royalties were not included in the survey because there is no specific formula by which they can be calculated.

The decreased turnover rate that supported Hypothesis H3 is not only an internal effect of increased motivation, but also a consequence of the difficulty of securing human resources in Japan, where labour shortages are unprecedented; securing labour is a very high priority in Japanese business management. Turnover was significantly associated with medical expenses, meaning the turnover rate may decrease if medical expenses increase. Studies outside Japan (Kizzy and Lisa,

2008) have indicated that when medical expenses rise due to employees requiring medical treatment, employees thus affected are expected to retire. However, this is less prevalent in Japan due to Japan's unique shortage of workers given the declining working population. Given that the cost of replacing employees is expected to increase, it is important to improve the work environment by avoiding layoffs and enhancing work-life balance. The interview with Fujitsu General Limited did not suggest that the turnover rate will increase with the rise in medical expenses. Rather, reduced turnover was expected in the medium term and reduced medical expenses in the long term.

Conclusions

Companies that adopted health and productivity management exhibited the following characteristics, which differed from those reported in previous studies and from those hypothesised:

- health and productivity management increased medical costs and absence rates,
- greater medical expenses were possibly associated with decreased turnover.
- the number of years engaged in health and productivity management strategy and the amount invested per person did not influence internal effects.

All three points are highly likely to be unique to Japan. Japan has an unprecedented shortage of workers due to its progression toward a super-aged society, and its unique insurance system has little impact on medical expenses incurred by companies. Further, many companies pursue incentives that are difficult to adopt and that increase medical expenses. Japan is the oldest society in the world, and medical expenses are increasing throughout the country. Naturally, medical expenses are increasing as the average age of em-

ployees is increasing.

It is interesting that, despite the short period over which health management initiatives were adopted, a trend was observed toward increased medical expenses and decreased turnover. In the future, Japan will be a super-aged society, and medical expenses for the whole country, including medical expenses for companies, will increase. It has been suggested that health and productivity management initiatives could decrease turnover; the number of companies engaged in health and productivity management has increased to more than one-third of listed companies (METI, 2020). This number will likely increase in the future. In addition, based on the aforementioned results and the interview, a possible causal chain was identified: increase in medical expenses per person → increase in the absence rate → decrease in turnover.

Finally, in this analysis we used surrogate indicators for productivity improvement and increased motivation. Therefore, we suggest two ways in which the health and productivity management survey of METI could be improved.

First, assessments could be improved for an improvement in productivity and increased motivation. For example, the absenteeism and presentism rates could be assessed, along with royalties and employee engagement, and the overall health risks associated with the stress-check system (Ministry of Health, Labour and Welfare, 2015), the latter of which is a unique and mandatory initiative in Japan. Second, the survey could incorporate prior health investment results. In this study, we used health investment as a proxy for the amount invested in one year. However, the invested amount is a forecast, not a realised, amount. Collecting investment results from the previous year would enable more accurate verification of health investment returns.

By implementing these two recommendations in the health and productivity management survey, many internal effects of Japan's unique health and productivity management could be measured, and further research facilitate.

References

- Arai, T., Uenishi, K., Gemba, K. (2019a), Expected effects and actual situation of "Health and Productivity Management" in Japan, *Journal of Japan Association for Management Systems*, 36(1): 55-61.
- Arai, T., Uenishi, K., Gemba, K. (2019b), Analysis of return on health investment of "Health and Productivity Management," *Pharmacometrics*, 96: 77-84.
- Astrella, J.A. (2017), Return on investment: Evaluating the evidence regarding financial outcomes of workplace wellness programs, *The Journal of Nursing Administration*, 47(7/8): 379-383. DOI: 10.1097/NNA.0000000000000499
- Baicker, K., Cutler, D., Song, Z. (2010), Workplace wellness programs can generate savings, *Health Affairs*, 29(2): 304-311. <https://doi.org/10.1377/hlthaff.2009.0626>
- Buck Consultants. (2009), Report of working well: A global survey of health promotion and workplace wellness strategies. San Francisco: Buck Consultants.
- BUPA (2009), Healthy work – Challenges and opportunities to 2030. Report
- Cabinet Office (2014), 2012 White Paper on Aging Society (Overview), retrieved from: https://www8.cao.go.jp/kourei/whitepaper/w-2012/gaiyou/s1_3_1.html. (accessed 14 March 2020).
- Corporate Health Achievement Award, retrieved from: <http://www.chaa.org/prioraward.htm>. (accessed 17 October 2018).
- European Network for Workplace Health Promotion (2009), Work in tune with life, retrieved from: <http://www.enwhp.org/enwhp-initiatives/current-initiative-work-in-tune-withlife.html>. (accessed 20 October 2009).
- Fabius, R., Thayer, R.D., Konichi, D. L., Yarrow, C.M., Peterson, K.W., Isaac, F., Loeppke, R.R., Eisenberg, B.S., Dreger, M. (2013), The link between workforce health and safety and the health of the bottom line tracking market performance of companies that nurture a "culture of health," *Journal of Occupational and Environmental Medicine*, 55(9): 993-1000. DOI: 10.1097/JOM.0b013e3182a6bb75.
- Fujitsu General Limited (2020), Fujitsu General Group Company Profile, retrieved from: <https://www.fujitsu-general.com/jp/corporate/profile/index.html>. (accessed 14 March 2020).
- Hoken Co., Ltd. (2013), "Health and productivity management" to create health-oriented people and foster culture, *Health Up* 21: 16-17.
- Imperial Data Bank (Teikoku dōtabanku) (2019), Trend survey of "Labor Shortage Bankruptcy" (January to December 2019), retrieved from: <http://www.tdb.co.jp/report/watching/press/p200104.html>. (accessed 24 February 2020).
- Jamison, D.T., Alleyne, G., Breman, J.G., Claeson, M., Evans, D., Jha, P., Measham, A.R., Mills, A., Musgrove, P. (2006), Disease control priorities in developing countries, Washington, DC: Oxford University Press/World Bank.
- Kaelam, R., Chiba, K. (2011), The forefront of profitable "Health Management", *Newsweek* (Japanese version), March 2, pp. 48-53.
- Kizzy, M., Lisa, A. (2008), Organizational wellness programs: A meta-analysis, *Journal of Occupational Health Psychology*, 13(1): 58-68. DOI: 10.1037/1076-8998.13.1.58.
- Loeppke, R., Taitel, M., Haufle, V., et al. (2009), Health and productivity as a business strategy: A multiemployer study, *Journal of Occupational and Environmental Medicine*, 51(4): 411-428. DOI: 10.1097/JOM.0b013e3181a39180.
- Mayo, E. (1977), The human problems of an industrial civilization, New York: Ayer Co. Pub.

- Ministry of Economy, Trade and Industry (2015a), Health and productivity management brand, retrieved from: http://www.meti.go.jp/policy/mono_info_service/healthcare/kenko_meigara.html. (accessed 17 October 2018).
- Ministry of Economy, Trade and Industry. (2015b), The Health and Productivity Management Survey, retrieved from: https://www.meti.go.jp/policy/mono_info_service/healthcare/kenkoukeieidouchoua.html. (accessed 24 February 2020).
- Ministry of Economy, Trade and Industry (2017), Superior Health and Productivity Management Corporation, retrieved from: http://www.meti.go.jp/policy/mono_info_service/healthcare/kenkoukeiei_yuryouhouzin.html. (accessed 17 October 2018).
- Ministry of Economy, Trade and Industry (2018), Superior Health and Productivity Management Corporation, retrieved from: https://www.meti.go.jp/policy/mono_info_service/healthcare/downloadfiles/kenkoukeieryuohojin2018_daikibo_list_20181015.pdf. (accessed 14 March 2020).
- Ministry of Economy, Trade and Industry (2020), Superior Health and Productivity Management Corporation, retrieved from: <https://www.meti.go.jp/press/2019/03/20200302004/20200302004.html>. (accessed 2 March 2020).
- Ministry of Health, Labour and Welfare (2015), Stress check system, retrieved from: <https://www.mhlw.go.jp/bunya/roudoukijun/anzeneisei12/index.htm>. (accessed 24 February 2020)
- Porter, L.W., Steers, R.M. (1973), Organizational, work, and personal factors in employee turnover and absenteeism, *Psychological Bulletin*, 80(2): 151-176. DOI: 10.1037/h0034829
- Porter, M.E. (2003), *Competitive strategy*, New York, NY: Free Press.
- Rosen, R.H. (1992), *The healthy company*, New York, NY: Tarcher.
- Taylor, F.W. (1997), *The principles of scientific management*, New York: Dover Publications.
- The American College of Occupational and Environmental Medicine, retrieved from: <https://acoem.org/About-ACOEM/Excellence-in-Corporate-Health-Achievement-Award> (accessed 16 March 2020).
- University of Tokyo Working Group Report (2015), METI healthy life extension project creation promotion business, retrieved from: <https://pari.ifi.u-tokyo.ac.jp/unit/H27hpm.pdf>. (accessed 24 February 2020).

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