

# Survey on the Future Demand for Talent in the Gaming Industry of Macao: A Briefing

Macau Polytechnic Institute

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## I. Status Quo of Human Resources in 2017

As of the end of 2017, the number of employees of the six licensed gaming enterprises totaled 60,424, of whom 56,409 were local employees; and 4,015 were non-local employees. Among the total demand, 93.4% was local while 6.6% was non-local (see Figure 1).

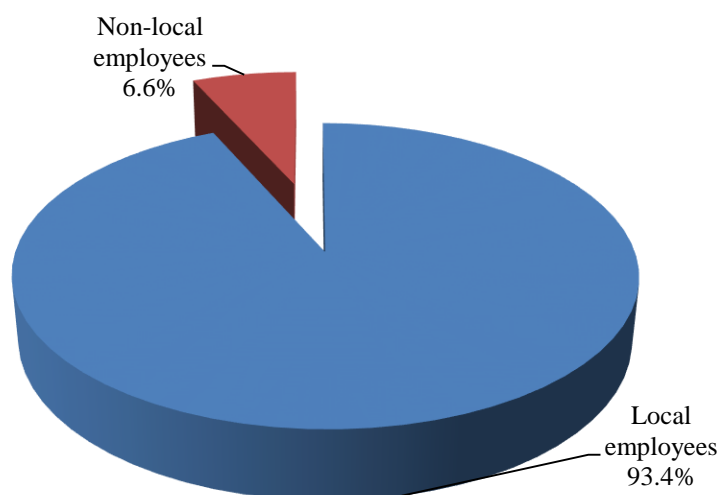


Figure 1 Proportions of local and non-local gaming-industry employees in 2017

Based on the classification of the 2015 survey and the *Profession Classification of Macao* (version 1997) issued by the Statistics and Census Service (DSEC), we classified all the employees of the six gaming enterprises into four levels: senior management<sup>1</sup>, middle management, professionals, and grassroots employees\*. According to the data of the six gaming enterprises, the proportions of positions of the Gaming Industry in Macao in 2017 was as follows: Senior management accounted for 0.8%, and middle management comprised 30.4%. Professionals accounted for 1.3%, and grassroots employees occupied 67.5%. The numbers of employees in 2017 of the four respective levels were 499, 18,381, 771, and 40,773 (see Table 1).

Table 1 Composition of positions of the six gaming enterprises in 2017

Level	No. of employees	Proportion
Senior management	499	0.8%
Middle management	18,381	30.4%
Professionals	771	1.3%
Grassroots employees	40,773	67.5%
Total	60,424	100.0%

<sup>1</sup>After discussion with the gaming enterprises, this survey only defines management personnel at the company level as senior management. The classification is slightly different from that of 2015.

\*This study defines management as "personnel who achieve corporate objectives by coordinating and supervising the activities of others." Specifically, personnel who have a subordinate (someone who reports to the former) are deemed to be management personnel.

Among senior management, the proportion of "casino director/deputy casino director" (234 employees) was the largest, accounting for 46.9% of the total number of senior management. Among middle management, the proportion of "gaming table supervisor/director/area manager"\* (5,621 employees) was the largest, accounting for 30.6% of the total number of middle management.

The total number of management personnel (senior and middle management) of the six gaming enterprises in 2017 reached 18,880, accounting for 31.2% of the total employees. Among senior management, local employees accounted for 76.8% while non-local employees, 23.2%. Among middle management, local employees accounted for 97.4% and non-local employees occupied 2.6%.

Among professionals, "electronic and electrical engineer/property service engineer" had the most employees at 166, accounting for 21.5% of the total number of professionals. "Electronic and electrical engineer/property service engineer" had the most non-local employees at 26, accounting for 21.5% of the total number of such employees.

Among grassroots employees, "dealer" had 24,096, accounting for 59.1% of the total number at the grassroots level. Among grassroots employees, non-local employees accounted for 8.3% and local employees occupied 91.7%. The position with the most non-local employees was "security guard." In 2017, the number of non-local employees was 1,220. Non-local employees accounted for 34.7% of the total number of such employees.

## **II. Forecast of Demand for Talents in the Next Three Years (2018-2020)\***

As of the end of 2020, the total number of talents demanded by the six gaming enterprises would be 67,949 with a net increase of 7,525 or 12.5% from 2017 (60,424). It is worth noting that the net increase would be mainly driven by one of the licensed gaming enterprises. It is estimated that the enterprise would increase its number of employees by approximately 5,200. Additionally, 3,765 employees will become 60 years old\* and may retire between 2018 and 2020. If this figure is considered, the net increase between 2018 and 2020 would be 11,290 from 2017, which is equivalent to 18.7% of the total number of employees in that year.

The number of senior management of the six gaming enterprises in the next three years is expected to be 531, which would rise by 32 or 6.4% from 2017. The 531 employees exclude the 55 who will be 60 years old and may retire then. If the 55 employees are included, the net increase will be 87 or 17.4% over the figure for 2017.

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\*Some gaming enterprises refer to this position as "casino manager and supervisor" or "casino manager and director."

\*In this survey, some of the gaming enterprises did not provide the "upper limit" of demand for talents in the next three and six years. Consequently, this research team could only analyze the "lower limit" of demand for talents in the periods.

\*According to general practices, employees begin to retire, when they reach the age of 60. However, gaming enterprises have abolished the regulation for retirement age. As long as an employee is healthy and willing to continue to work, he/she can continue to be employed even if he/she is 60 or older. Therefore, it is difficult to assess how many employees, who will be 60 years old in the next three years (2018-2020) and in the next six years (2020-2023), will retire or not. The demand for talents brought by retirement is very uncertain. The forecast here is extremely cautious. In other words, it forecasts the demand for employees, when all the employees who reach 60 years old retire. It is worth special attention.

The number of middle-management personnel of the six gaming enterprises in the next three years is expected to be 20,292, which would rise by 1,911 or 10.4% from 2017. The increase excludes the 734 employees who will be 60 years old then. If they are included, the net increase will be 2,645 or 14.4% over the figure for 2017.

In the next three years, the demand for professionals in the gaming industry would reach 857, which would increase by 86 or 11.2% from 2017. If the employees who will be 60 years old and may retire then are included, the net increase will be 123 or 16.0% over the figure for 2017.

In the next three years, the demand for grassroots employees would reach 46,269, which would increase by 5,496 or 13.5% from 2017. The increase excludes the 2,939 employees who will be 60 years old then. If they are included, the net increase will be 8,435 or 20.7% over the figure for 2017.

Overall, the total increase in management personnel (senior and middle management) of the six enterprises in the next three years would be 1,943. If the 789 employees who will be 60 years old retire, the six enterprises will need to add as many as 2,732 management personnel (Table 2).

Table 2 Forecast of Demand for Talents by the Six Gaming Enterprises from 2018 to 2020

Level	2017	2018-2020		
	Actual no. of employees	Estimated no. of employees	Growth from 2017	Age 60
Senior management	499	531	32	55
Middle management	18,381	20,292	1,911	734
Professionals	771	857	86	37
Grassroots employees	40,773	46,269	5,496	2,939
Total	60,424	67,949	7,525	3,765

### III. Forecast of Demand for Talents in the Next Six Years (as of 2023)

As of the end of 2023, the six gaming enterprises in Macao would demand for 71,355 employees with a net increase of 3,406 or 5% from 67,949 (excluding the employees who will be 60 years old) between 2018 and 2020. Additionally, at the end of 2023, 7,987 employees will become 60 years old and may retire. Thus, the total demand would be 79,342. This figure (79,342) would be 11,393 or 16.8% more than 67,949 (excluding the employees who will be 60 years old) between 2018 and 2020. If the employees who will be 60 years old between 2018 and 2020 and between 2021 and 2023 are considered, the demand for talents (79,342) between 2021 and 2023 would increase by 7,628 or 10.6% from the employees between 2018 and 2020 (71,714) (including employees who will be 60 years old).

The number of senior management would reach 563 between 2021 and 2023 with a net increase of 32 or 6.0% from 531 between 2018 and 2020. If the employees who will be 60 years old and may retire then are considered, the total demand would become 627 with a net increase of 41 or 7.0% from the demand between 2018 and 2020 (including employees who will be 60 years old).

The demand for middle management of the six gaming enterprises between 2021 and 2023 is expected to be 21,289, which would rise by 997 or 4.9% from that between 2018 and 2020. If the employees who will be 60 years old and may retire then are considered, the total demand would become 22,665 with a net increase of 1,639 or 7.8% from the demand between 2018 and 2020 (including employees who will be 60 years old).

The demand for professionals of the six gaming enterprises between 2021 and 2023 is expected to be 883, which would rise by 26 or 3.0% from that between 2018 and 2020. If the employees who will be 60 years old and may retire then are considered, the total demand would become 929 with a net increase of 35 or 3.9% from the demand between 2018 and 2020 (including employees who will be 60 years old).

The demand for grassroots employees of the six gaming enterprises between 2021 and 2023 is expected to be 48,620, which would rise by 2,351 or 5.1% from that (46,269) between 2018 and 2020. If the employees who will be 60 years old and may retire then are considered, the total demand would become 55,121 with a net increase of 5,913 or 12.1% from the demand between 2018 and 2020 (including employees who will be 60 years old).

Overall, the demand for senior and middle management between 2021 and 2023 would increase by 1,029. If the employees who will be 60 years old between 2018 and 2020 and between 2021 and 2023 are considered, the total demand reaches 1,680.

#### **IV. Summary of Demand for Talents in the Next Six Years**

Compared with 2017, the number of employees of the six gaming enterprises in Macao in the next six years would amount to 71,355 with a net increase of 10,931. The number of employees who will reach 60 years old in the next six years will be 7,987. If all of them will retire, the total demand would climb by 18,918.

In the next six years, the number of management personnel of the six gaming enterprises in Macao will increase by 2,972. If the 1,440 employees who will be 60 years old and may retire then are considered, the six gaming enterprises will demand 4,412 new management personnel (see Table 3).

Table 3 Comparison in Forecast of Demand for Talents Between the Next Three Years, Six Years and 2017

	2017	2018 - 2020			2021 - 2023		
Level	Actual no. of employees	Estimated no. of employees	Growth from 2017	Age 60, could retire	Estimated no. of employees	Growth from 2017	Age 60, could retire
Senior management	499	531	32	55	563	64	64

Middle management	18,381	20,292	1,911	734	21,289	2,908	1,376
Professionals	771	857	86	37	883	112	46
Grassroots employees	40,773	46,269	5,496	2,939	48,620	7,847	6,501
Total	60,424	67,949	7,525	3,765	71,355	10,931	7,987

In the next six years, the positions that may demand the most employees would "gaming table supervisor/director/area manager (395 employees)," "gaming table director/assistant (320)" and "casino manager and supervisor (180)." The total increase of the three positions would account for 30.1% of the total increase in management personnel.

The demand for talents in the next three or six years may be affected by technological development. Artificial intelligence and/or robots may replace manpower for some positions. Currently, however, the impact of technological development is not obvious. Moreover, three or six years would be a short period of time, and gamblers prefer to interact with humans rather than machines.

## V. Analysis of Job Requirements for All Positions

In this survey, 124 positions\* of the six gaming enterprises were investigated, wherein the job requirements of 117 positions were provided. This research team used the "word frequency analysis method" to analyze the requirements for professional competence and qualification. This research team found that the most important employee capability required by the gaming industry is language competence. Cantonese, Mandarin, and English are the most basic language requirements. The requirement for English ("fluency") is higher for a higher position. And the requirement for English ("English competence preferred") is lower for a lower position. Besides the above languages, some gaming enterprises require their employees to speak other languages. Ten positions prefer employees to speak Japanese, and ten positions prefer employees to speak Korean. Additionally, three positions prefer employees to speak Taiwanese while two positions prefer Malaysian.

The second important capability is office software skills, including word, excel, and PPT. Moreover, the gaming enterprises prefer employees with the ability of systematical management. Thirty-three of the 117 positions require employees to understand management systems, including Genesis, ASCS, ERP and AutoCAD.

The third capability is communication skills. Analytical and problem-solving capabilities rank fourth. Moreover, the gaming enterprises require employees to have organizing and customer service capabilities. 22 positions require such capabilities. There is another requirement, which is not related to capability but job nature: shift. The analysis of job requirements of 117 positions in this survey is shown in Table 4.

Table 4 Analysis of the job requirements of the 117 positions

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\* The number of positions in this part is 124, which is different from 114 mentioned above, because some job requirements provided by the gaming enterprises only contain description of position rather than job title and number of employees.

Job Requirement	Frequency	Job Requirement	Frequency
Mandarin	115	Communication skills/interpersonal communication	31
Cantonese	112	Problem-solving/analytical capabilities	26
English	111	Organizing ability	22
Software	97	Customer service	22
Shift	41	Flexible work	11
Systematical management	33	Leadership	10

In the area of management science, the skills of employees required by enterprises are generally classified into three categories: conceptual, interpersonal, and technical skills. Conceptual skill refers to the skill to reflect on and conceptualize a complex situation. Analytical and problem-solving capabilities like the distinction between right and wrong, tendency judgment, opportunity discovery and prioritization are covered. Interpersonal skills mainly refer to the ability to communicate with others, build trust, and handle relationships. Technical skills mainly refer to the ability to handle business or grasp work knowledge. In accordance with the analysis of job requirements for the 117 positions of the gaming enterprises, the most important ability required for all levels of employees is interpersonal skills. Language competence, communication skills, interpersonal communication, and even customer service capability listed in the table belong to interpersonal skills. Technical skills rank second, which covers the capabilities to use software and management systems. Contrastingly, conceptual skills are relatively less important. Among the requirements, only "analytical and problem-solving capabilities" and "leadership" belong to technical skills. Therefore, we are convinced that, the Gaming Industry in Macao mainly requires employees who are operation-oriented rather than planning-oriented. The job requirements of the Gaming Industry in Macao are basically the same as those of Western countries. This may be determined by the special nature of the gaming industry.

In summary, this research team concluded that, the core skills of employees required by the gaming industry is the language competence of Cantonese, Mandarin, and English, basic office software skills, ability to use different management systems (Different enterprises may use different management systems), communication and interpersonal skills, and analytical and problem-solving capabilities. In addition to basic skills, each employee is expected to have a good work attitude.



## **VI. Regression Analysis and Forecast of Demand for Talents of the Gaming Industry in Macao**

Because the future is full of uncertainties, there is no way to ensure that the forecast will not have a deviation. To this end, it is necessary to adopt varied forecasting methods to reduce the risk of deviation. This research team decided to further forecast the demand for talents of the gaming industry with regression analysis. This research team regarded the number of employees in the gaming industry as the dependent variable, while the number of gaming tables was regarded as the independent variable. It collected data of 14 years from 2004 to 2017 and established a regression-analysis model to forecast the demand for talents of the gaming industry. The regression results show that, the number of gaming tables has a significant and positive impact on the number of employees in the gaming industry.

According to the policy for the growth of gaming tables of the Macao S.A.R. government, the average annual growth rate of gaming tables will be 3% in the next 10 years from 2013. \*This research team forecast that the number of gaming tables would be 7,072 and the demand for talents would be 62,819 in the future three years (2018-2020). The number of gaming tables would be 7,728 and the demand for talents would be 67,155 in the future six years (2023).

Compared with the forecast demand for talents by the six gaming enterprises between 2018 and 2020 (67,949), the forecast demand of this research team (62,819) is somewhat conservative. The former is 5,130 or 8% more than the latter. Similarly, the forecast demand for talents by the six gaming enterprises between 2021 and 2023 (71,355) is 4,200 or 6% more than that of this research team (67,155).

The forecast results of this regression model are different from those provided by the gaming enterprises. This is a normal phenomenon because it is difficult to decide which method is the best in the face of uncertainties in the future. As long as the forecast method is logically or theoretically reasonable, the results are of reference value. Consequently, this survey can serve as a reference for the Macao S.A.R. government to make a decision on human resources.

## **VII. Suggestions**

1. All sectors of society expect that grassroots employees in the gaming industry would improve their working competence. Grassroots employees in the Gaming Industry in Macao account for a big proportion (e.g. dealer). They tend to have a low education background and simple work skills. Measures should be taken to enhance their capabilities and employability.
2. The future impact of employees 60 years old and above on the gaming industry should be stressed. Based on this survey, the proportion of employees who are 60 or older against the number of new employees will be high, although all of them may not retire. However, in consideration of human resources of Macao, on one hand, we should fill up the vacancies due to retirement. On the other hand, we should consider

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\*For the growth of gaming tables in the next 10 years estimated by the Macao S.A.R. government, the number of gaming tables at the end of 2012 is regarded as the base. The year 2013 is the first. In order to match the time in this survey, we regard the number of gaming tables at the end of 2013 as the base. Thus, ten years later it will be 2023.

the increase in social services like pension due to retirement.

3. The government is expected to attach more importance to the cultivation of professional and technical talents in the gaming industry. This survey found that, the proportion of non-local professionals and technicians in the gaming industry is high (e.g. "electronic and electrical engineer/property service engineer," "audio-visual equipment technician," and "controller of supervisory department"). The government is suggested to enhance policies for the cultivation of professional and technical talents and reduce the demand for non-local talents for such positions.

4. Employees' abilities in foreign languages and management and information systems should be improved. In line with the analysis of job requirements for the 117 positions, the market demands talents who can speak Japanese and Korean. This is because Japan and South Korea are the largest overseas tourist markets for Macao. They are the most important sources of gamblers besides Greater China. Thus, the gaming industry demands more talents who understand Japanese and Korean. Thus, university education or non-degree education in Macao is expected to place Japanese and Korean language education at a more important position. As more information systems will enter the gaming industry, universities in Macao should raise courses in this aspect. The government should encourage and guide employees of Macao to grasp such skills to meet the demand of enterprises.

5. Based on our analysis of future trends of technological development, we deem that, along with their growth, new technologies like AI and data technologies will become more and more important to the Gaming Industry in Macao. Without the application of data technologies to operations, gaming enterprises may lose competitiveness in the future. Although job requirements of the gaming enterprises do not indicate the demand in this aspect, the Macao S.A.R. government should take precautions and adopt policies or measures to encourage gaming enterprises to raise their investment in this aspect.

6. The government needs to announce policies related to gaming license re-bidding as appropriate. In this survey, almost all the licensed enterprises emphasized that, the future demand for talents will depend on gaming license re-bidding conditions of the government. From the point of view of practitioners of the gaming industry, gaming license re-bidding policies and conditions will influence the number of employees, job requirements, remuneration range, and proportions of positions.