

# Who files provisional applications in the United States?

Chi-Tung Chen<sup>1</sup> · Dar-Zen Chen<sup>2</sup>

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**Abstract** This study used the US Patent Application Database to identify who files provisional applications in the United States. Preference ratios, use ratios, and provisional application to nonprovisional application ratios were used to evaluate the filing behavior of applicants in filing provisional applications with respect to nonprovisional applications. Factors encouraging filing provisional applications include the possibility to obtain an earlier filing date, a longer patent term, and an earlier promoting opportunity. Factors discouraging filing provisional applications include the eventual higher cost in filing nonprovisional applications and the additional requirements for foreign applicants to file patent applications in the United States. These factors are discussed in this paper to explain the filing behavior of applicants in filing provisional applications with respect to nonprovisional applications. Applicants from the United States, Israel, and Canada were more likely to file provisional applications than applicants from other countries. We propose that the English ability of the applicants and additional requirements for foreign applicants might be the cause of this result. Applicants in the category of Drugs and Medical were more likely to file provisional applications than applicants in other categories. We propose that the possibility for obtaining an earlier filing date and a longer patent term might be the cause of this result.

**Keywords** Provisional application · Nonprovisional application · Patent term

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✉ Dar-Zen Chen  
dzchen@ntu.edu.tw

Chi-Tung Chen  
d94522022@ntu.edu.tw

<sup>1</sup> Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan

<sup>2</sup> Department of Mechanical Engineering and Institute of Industrial Engineering, National Taiwan University, Taipei, Taiwan

## Introduction

A provisional application for a patent is a US national application filed in the United States Patent and Trademark Office (USPTO) that was designed to provide a low-cost opportunity for first patent filing in the United States and has been available to applicants since June 8, 1995. A provisional application does not require a formal patent claim, oath, or declaration. In addition, provisional applications should not include any information disclosure (prior art) statement, because provisional applications are not examined. A provisional application enables establishing an early effective filing date in a later filed nonprovisional patent application. In addition, it allows the term “patent pending” to be applied in connection with the description of an invention. A provisional application has a pendency of 12 months beginning from the date on which the provisional application is filed. The 12-month pendency period cannot be extended. Therefore, an applicant who files a provisional application must file a corresponding nonprovisional patent application during the 12-month pendency period of the provisional application to benefit from the earlier filing of the provisional application. By first filing a provisional application, and subsequently filing a corresponding nonprovisional application that references the provisional application within the 12-month period, a patent term endpoint may be extended by up to 12 months (USPTO 2015a).

The provisional application filing approach has been offered to applicants for two decades, and the USPTO does not make its database of provisional applications publicly available in any other form than the individual files that can be retrieved through Patent Application Information Retrieval (Crouch 2014). Therefore, answering the following two crucial questions regarding the filing behavior of applicants remains difficult: (1) who files provisional applications in the United States? (2) why do applicants file provisional applications in the United States? In order to analyze these two questions, a preliminary study was conducted (Chen and Chen 2015), and this study further investigates provisional applications to better understand the filing behaviors of applicants.

According to the USPTO, the most obvious advantages of filing a provisional application are (1) obtaining an early effective filing date at a low cost and with an easily prepared application; (2) extending the statutory patent term for up to 1 year; and (3) the ability to use the term “patent pending” for an earlier promotion opportunity (USPTO 2015a). Therefore, applicants who require an earlier filing date, a longer patent term, or an earlier promotion opportunity might be interested in filing provisional applications in the United States. However, although the provisional application is designed to provide a low-cost first patent filing in the United States, an applicant must still spend additional money for filing a corresponding nonprovisional application to obtain a patent. In addition, although the provisional application was intended as an easily prepared application because it may be filed in a language other than English, a foreign applicant still faces additional requirements as stated in the US patent regulations or the domestic patent regulations to prosecute the provisional application in the United States. Therefore, filing provisional applications in the United States entails advantages and disadvantages (Miller 1996). Accordingly, the following factors encourage filing provisional applications: (1) the earlier filing date; (2) the longer patent term; and (3) the earlier promotion opportunity. The following factors discourage filing provisional applications: (1) the eventual higher cost in filing the nonprovisional application; and (2) the additional requirements for foreign applicants to file patent applications in the United States.

## Literature review

Most literature references relating to the issue of provisional application are law journals, and focus on legal aspects. For example, Anderson et al. (2014), Barney (1999), Cruz (2007), Van Horn (1994) and Marcus (2007) provided general procedures of filing provisional application in the US and discussed its advantages and disadvantages; Eldering et al. (1997) further provided comparative analysis of provisional applications under US and UK Law; Gottuso (2011) discussed whether the provisional application can be deemed as a secret prior art to bar future patents; Miller (1996) discussed the effect of provisional applications and Paris convention priority rights, and concluded that they have the same effect. None of the above-mentioned literature references addressed the issue of who files provisional applications in the United States.

Nonetheless, some previous studies have implied that applicants' country of origin might be a factor influencing the filing of provisional applications in the United States. Crouch (2012) stated that, most provisional applications are filed for inventions originating in the United States. Anderson et al. (2014) stated that certain foreign laws limit the filing of patent applications abroad prior to a national patent application filing or authorization. Moreover, according to Anderson et al. (2014), because of domestic regulations, applicants from Asian countries are less willing to file their first patent application in the United States. Because a provisional application is typically the first application for an invention, applicants from Asian countries are generally unwilling to file provisional applications in the United States. Eldering et al. (1997) raised the concern that if foreign filings are pursued claiming the US provisional application filing date as the priority date, will the provisional meet the regional and/or national requirements of those countries? Eldering et al. (1997) stated that perhaps the most fundamental question with respect to the use of US provisional patent applications as international priority documents is the assurance that the US provisional application will serve as a regular national filing, and that the content of the US provisional application is sufficient to meet the regional and national requirements of other countries. Crouch (2008) studied approximately 15,000 utility patents issued in April and May 2008 and determined that only 21 % of issued patents claiming priority from a provisional application and only 5 % of the patents that were associated with a provisional application were assigned to international applicants, whereas 30 % of the patents that were associated with a provisional application were assigned to a US applicant. Israel and Canada filed the highest proportion of provisional applications, and only 2 % of patents filed by Japanese and Korean applicants included provisional parent claims.

In addition, some previous studies have proposed that applicants' industry might be a factor influencing the filing of provisional applications in the United States. Van Horn (1994) stated that the provisional application filing approach could be beneficial in highly competitive areas where the disclosure of even a single species of an invention may have important advantages in terms of establishing a constructive reduction to practice or an early prior art effect date. Eldering et al. (1997) stated that industries with rapidly changing technologies and short product cycles have key advantages of the provisional patent applications. Moreover, Crouch (2008) determined that new drug inventions exhibited the highest rate of association with a provisional application, and patents on electrical and electronic applications exhibited the lowest rate of provisional filing. Although Crouch (2008) provided an insight into the provisional application filings in the United States, but the dataset he used was small and limited by time (his data comprised approximately 15,000 utility patents issued in April and May 2008). Consequently, the results were not representative; moreover, Crouch (2008) provided results but analysis was lacking.

## Hypotheses and analysis methods

We formulated two hypotheses for conducting a provisional application analysis. First, according to Crouch (2008), Anderson et al. (2014) and other studies, we assumed that national differences constitute a factor influencing who files provisional applications in the United States. Therefore, the first hypothesis is as follows:

**H1** Applicants' country of origin is a factor determining who files provisional applications in the United States.

Second, as proposed by Crouch (2008), new drug inventions exhibit the highest rate of association with a provisional application, and patents on electrical and electronic applications exhibit the lowest rate of provisional filing. In addition, Sukhatme and Cramer (2014) stated that the patent term is less critical to applicants in mechanical industries. Therefore, we assumed that the difference of applicants' industry is a factor influencing who files provisional applications in the United States. Therefore, the second hypothesis is as follows:

**H2** Applicants' field of industry is a factor influencing who files provisional applications in the United States.

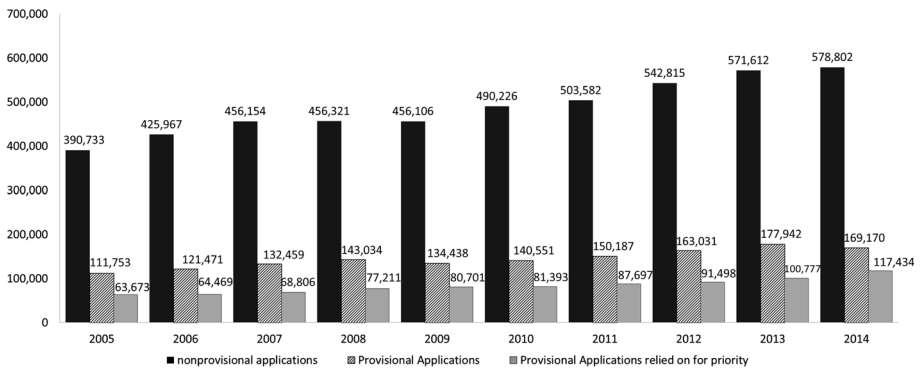
In this study, we tested the two hypotheses by using a comprehensive data set and conducted a detailed analysis to ensure representative results and clearly elucidate the filing behavior of applicants. First, we investigated the US Patent Application Database for 2005–2014 to determine who filed provisional applications by assessing the provisional application filings originating from various countries, technological categories, assignee types, and assignees. Second, we investigated the reasons for applicants filing provisional applications in the United States.

## Trends in filing provisional applications

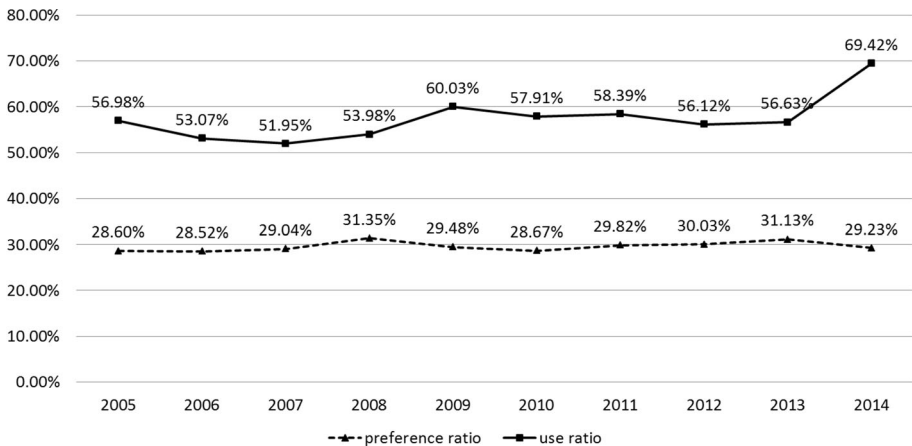
According to previous studies, provisional application filings have continued to increase, but the rate of abandonment has also increased (Crouch 2012, 2013). Because no database of provisional applications has been published, the filing numbers of provisional applications can be obtained only from annual fiscal reports published by the USPTO (USPTO 2015b). Moreover, because the USPTO does not publicly release provisional applications that are not relied on for claiming priority by nonprovisional applications, we employed the USPTO Patent Application Database to determine the number of provisional applications that have been used to claim priority in at least one nonprovisional application.

Figure 1 shows the trends in filing provisional applications. The black bars represent the number of nonprovisional utility applications filed each year between 2005 and 2014; the hatched bars represent the number of provisional applications filed each year between 2005 and 2014; and the grey bars represent the number of provisional applications filed each year between 2005 and 2014 that are used to claim priority in nonprovisional applications. The USPTO reports the number of provisional applications only according to the fiscal year; therefore, the number of provisional applications filed each year between 2005 and 2014 was calculated according to the fiscal year (October 1 to September 30), rather than the calendar year (January 1 to December 31).

As shown in Fig. 1, between 2005 and 2014, over 4.87 million nonprovisional applications and over 1.44 million provisional applications were filed. Among the 1.44 million provisional applications, over .83 million provisional applications were converted to



**Fig. 1** Nonprovisional applications, provisional applications, and provisional applications relied on for claiming priority each year for 2005–2014



**Fig. 2** Yearly preference and use ratios for 2005–2014

nonprovisional applications. Therefore, both nonprovisional applications and provisional applications continued to increase, with over 578,000 and 169,000 nonprovisional and provisional applications, respectively filed in 2014. Nonprovisional applications and provisional applications decreased in 2009, possibly because of the financial crisis of 2008.

Figure 1 shows that the number of provisional applications relied on for claiming priority in nonprovisional applications has been increasing. Although provisional applications have increased, applicants have also increasingly abandoned provisional applications without relying on them for claiming priority. The difference between each pair of hatched and grey bars is the number of provisional applications abandoned each year.

**Ratio of provisional applications to nonprovisional applications**

The ratio of provisional applications to nonprovisional applications (hereafter referred to as “preference ratio”) shows the preference of applicants for filing provisional rather than nonprovisional applications. In Fig. 2, the dotted line shows the preference ratio of all provisional applications filed each year between 2005 and 2014. The preference ratio

clearly continued to increase steadily during this period, except for 2009–2010 and 2014. The mean preference ratio between 2005 and 2014 was 29.59 %, and its standard deviation was 1.01 %. This indicates that the preference ratio was stable between 2005 and 2014.

### **Ratio of provisional applications relied on for claiming priority to all provisional applications**

A provisional application has a pendency of 12 months beginning from the date on which the provisional application is filed. An applicant who files a provisional application must file a corresponding nonprovisional application for a patent during the 12-month pendency period of the provisional application to benefit from the earlier filing (USPTO 2015a); otherwise, the provisional application is automatically abandoned. Therefore, we determined the use ratio of the provisional applications used for claiming priority in nonprovisional applications (hereafter referred to as “use ratio”). The use ratio represents the ratio of provisional application relied on for claiming priority to all provisional applications.

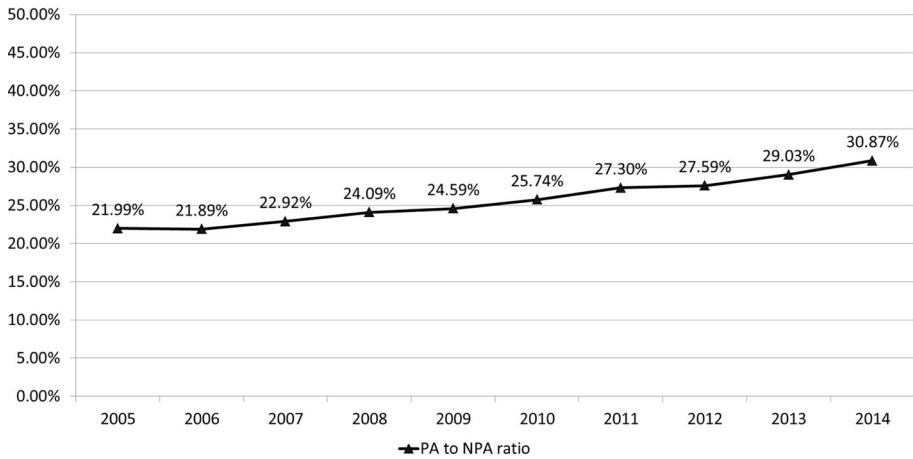
The result is shown in Fig. 2, and the solid line represents the use ratio of all provisional applications filed each year between 2005 and 2014. As shown in Fig. 2, the use ratio of provisional applications was between approximately 52 % and 69 % in 2005–2014. In other words, approximately 31–48 % of the provisional applications were abandoned without being converted to nonprovisional applications each year between 2005 and 2014. Furthermore, Fig. 2 shows that in 2014, the use ratio increased to its highest value of 69.42 %. The mean value of the use ratio between 2005 and 2014 was 57.45 %, and its standard deviation was 4.89 %. This indicates that the use ratio was stable between 2005 and 2014.

### **Ratio of provisional applications relied on for claiming priority to all nonprovisional applications**

The ratio of provisional applications relied on for claiming priority to all nonprovisional applications (hereafter referred to as “PA to NPA ratio”) shows both the filing preference and the usage of provisional applications. The PA to NPA ratio relates to both the preference and use ratios, and it can be calculated by dividing the published nonprovisional applications that claimed priority from at least one provisional application by all published nonprovisional applications. Because the USPTO does not publicly release the provisional applications that are not relied on for claiming priority in nonprovisional applications, the PA to NPA ratio has become the only practical ratio for evaluating provisional applications with respect to nonprovisional applications according to various countries, technological categories, and assignees. The solid line in Fig. 3 represents the PA to NPA ratio of all provisional applications filed each year between 2005 and 2014. Clearly, the PA to NPA ratio increased steadily during this period, reaching 30.87 % in 2014. The mean value of the PA to NPA ratio between 2005 and 2014 was 25.60 %, and its standard deviation was 3.05 %. Therefore, the PA to NPA ratio was stable between 2005 and 2014.

### **Provisional applications according to country of origin**

The filing date of a provisional patent application can be used as a foreign priority date for applications filed in countries other than the United States. Therefore, a foreign applicant can first file a patent application as a provisional application in the United States, and



**Fig. 3** Yearly PA to NPA ratio for 2005–2014

subsequently claim priority for the provisional application to file a nonprovisional patent application in the United States as well as in the country of origin.

Table 1 shows the ranking of the top 10 countries where applicants filed the most provisional applications and nonprovisional applications in the United States between 2005 and 2014. During this period, the top 10 countries where applicants filed the most provisional applications were the United States (US), Canada (CA), Germany (DE), Japan (JP), Israel (IL), the Netherlands (NL), Korea (KR), Taiwan (TW), France (FR), and Switzerland (CH); and the top 10 countries where applicants filed the most nonprovisional applications were the United States, Japan, Korea, Germany, Taiwan, France, China (CN), Canada, the Netherlands, and the Great Britain (GB). Table 1 shows that the rankings of provisional applications and those of nonprovisional applications varied for several countries. For example, Japan was ranked second in nonprovisional applications but fourth in provisional applications; Korea was ranked fourth in nonprovisional applications but seventh in provisional applications; Taiwan was ranked fifth in nonprovisional applications but eighth in provisional applications; France was ranked sixth in nonprovisional applications but ninth in provisional applications; and China was ranked seventh in nonprovisional applications but was not ranked in the top 10 in provisional applications. This implies that applicants in Japan, Korea, Taiwan, France, and China preferred filing their first applications in the United States as nonprovisional applications rather than as provisional applications. By contrast, applicants in the United States, Canada, and Israel preferred filing their first applications in the United States as provisional applications. This finding supports the hypothesis H1.

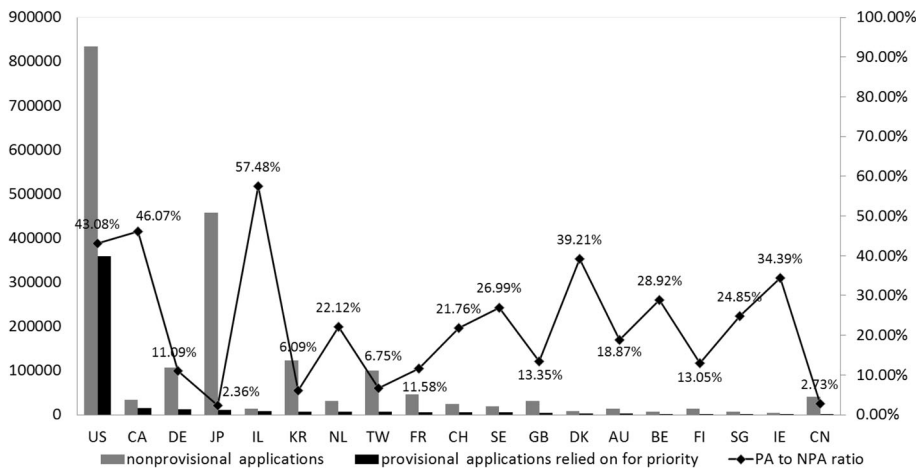
**Table 1** Ranking of the top 10 countries where applicants filed the most provisional applications and the most nonprovisional applications in the United States for 2005–2014

Ranking	1	2	3	4	5	6	7	8	9	10
Provisional applications	US	CA	DE	JP	IL	KR	NL	TW	FR	CH
Nonprovisional applications	US	JP	KR	DE	TW	FR	CN	CA	NL	GB

We determined the PA to NPA ratio to identify the preference of filing provisional applications for applicants in various countries. In addition, we investigated the US Patent Application Database, and determined that between 2005 and 2014, there were 19 countries (the United States, Canada, Germany, Japan, Israel, Korea, the Netherlands, Taiwan, France, Switzerland, Sweden (SE), the Great Britain, Denmark (DK), Australia (AU), Belgium (BE), Finland (FI), Singapore (SG), Ireland (IE), and China) where applicants filed more than 1000 provisional applications in the United States. Figure 4 shows these top 19 countries with the provisional applications, the corresponding nonprovisional applications and the PA to NPA ratio in the United States for 2005–2014. In Fig. 4, the black bars represent the number of provisional applications filed by applicants from each country in the United States for 2005–2014; the grey bars represent the number of non-provisional applications filed by applicants from each country in the United States for 2005–2014; the solid line represents the PA to NPA ratio of each country for 2005–2014. Figure 4 shows that the PA to NPA ratios of Japan (2.36 %), Korea (6.09 %), Taiwan (6.75 %) and China (2.37 %) were considerably lower than the average percentage (approximately 25.60 % according to Fig. 3).

This finding not only supports the hypothesis H1 but also shows that applicants from East Asia (Japan, Korea, Taiwan, and China) were less likely to file provisional applications in the United States. The eventual higher cost of filing the nonprovisional applications and the additional requirements for foreign applicants in filing patent applications in the United States might be the cause of this finding. The laws of certain countries limit the filing of patent applications abroad before filing a national patent application or obtaining authorization. For example, a foreign filing license from the Korean Intellectual Property Office is required for a Korean patent application describing defense-related inventions to be filed in the United States; otherwise, the Korean patent loses rights. Similarly, in China, all inventions require a foreign filing license (Anderson et al. 2014). Therefore, we expected the PA to NPA ratio to be low for applicants from these countries.

By contrast, the PA to NPA ratios of the United States (43.08 %), Canada (46.07 %), and Israel (57.48 %) were far above the average percentage. We reasoned that, compared with applicants from Japan, Korea, Taiwan, and China, applicants from the United States,



**Fig. 4** Top 19 countries where applicants filed the most provisional applications in the United States, and the PA to NPA ratios for 2005–2014



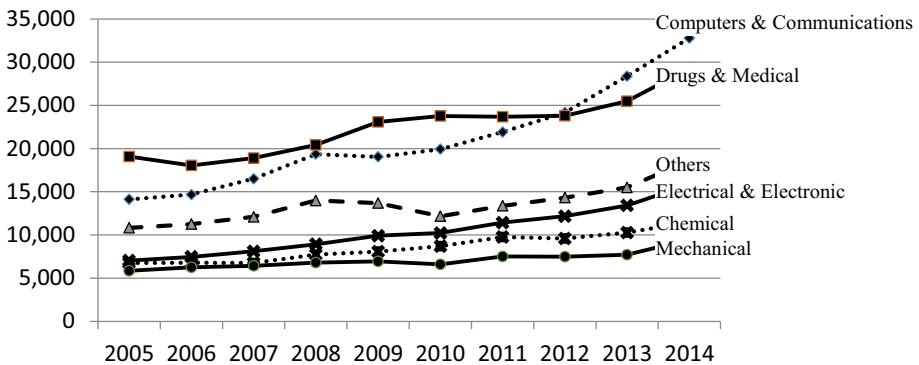
Canada, and Israel are either native English speakers or exhibit high English proficiency; therefore, applicants from these countries can relatively easily prepare a provisional application that is suitable for being relied on for claiming priority in a nonprovisional application to reduce the eventual higher cost in filing the nonprovisional application.

### Provisional applications according to technological category

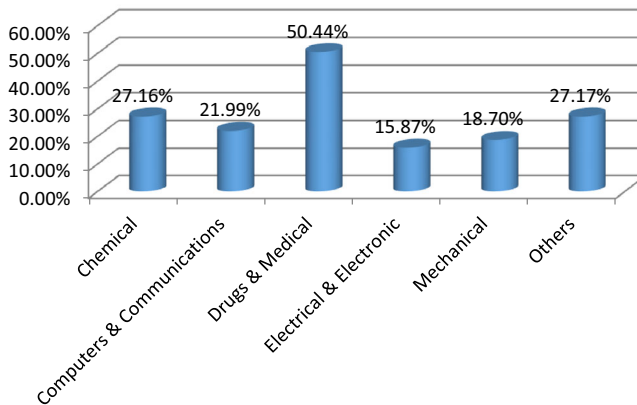
In this study, we adopted the six main technological categories (i.e., Chemical; Computers and Communications; Drugs and Medical; Electrical and Electronic; Mechanical; and Others) developed by the US National Bureau of Economic Research (NBER) (Hall et al. 2001) to analyze provisional applications according to their technological category.

Figure 5 shows the provisional applications relied on for priority filed each year between 2005 and 2014 according to the NBER main technological categories; Fig. 6 shows the PA to NPA ratios during 2005–2014 according to the NBER main technological categories. As shown in Figs. 5 and 6, Drugs and Medical was the most popular main technological category in which applicants filed provisional applications and subsequently converted them to nonprovisional applications by claiming priority. The average PA to NPA ratio of Drugs and Medical was 50.44 %, constituting the highest rate among the six categories. In other words, on average, for every two nonprovisional applications, one nonprovisional application was filed claiming priority from at least one provisional application. This finding supports the hypothesis H2. Sukhatme and Cramer (2014) suggested that an applicant who cares about the patent term is likely to increase the term if this is possible. Applicants in industries in which the patent term is particularly critical are more likely to file provisional applications than applicants in industries in which the term is less critical. Patent terms of Drugs and Medical patents are deemed crucial (Grabowski and Vernon 2000; Marcus 2007; Crouch 2008). Therefore, in the Drugs and Medical category, because the patent term is critical, the applicants tended to extend the statutory patent term for up to 1 year by first filing provisional applications instead of nonprovisional applications.

By contrast, Electrical and Electronic (average PA to NPA ratio, 15.87 %) and Mechanical (average PA to NPA ratio, 18.70 %) exhibited the lowest PA to NPA ratios. This finding supports the hypothesis H2. We assumed that, in these categories, longer



**Fig. 5** Provisional applications relied on for claiming priority filed each year for 2005–2014 according to the NBER main technological categories



**Fig. 6** PA to NPA ratios for 2005–2014 according to the NBER main technological categories

patent terms and earlier filing dates are less crucial, and therefore, the applicants filed fewer provisional applications than applicants in other categories.

We conducted an analysis of variance (ANOVA; Scheffé Test) for all categories and determined that the PA to NPA ratio of Drugs and Medical differed significantly from the other five categories; Electrical and Electronic differed significantly from the other four categories except for Mechanical; and Mechanical differed significantly from the other three categories except for Electrical and Electronic and Computers and Communications. The result is shown in Table 2. This finding not only supports the hypothesis H2 but also shows that applicants in the field of Drugs and Medical were more interested in filing provisional applications in the United States, and applicants in the field of Electrical and Electronic or Mechanical filed fewer provisional applications in the United States.

### Provisional applications according to assignee

Table 3 shows the top 10 assignees who filed the most nonprovisional applications in the United States between 2005 and 2014 and their corresponding provisional applications according to the top 10 assignees, and their PA to NPA ratios. Clearly, the PA to NPA ratio of each of the top 10 assignees was far below the average percentage (approximately 25.60 % according to Fig. 3). For example, the PA to NPA ratio of Hon Hai Precision, a corporation based in Taiwan, was only .06 %. Among 21,210 nonprovisional applications, only 12 nonprovisional applications claimed priority on the basis of early provisional applications. This indicates that filing provisional applications in the United States was not a strategy for these assignees who filed most nonprovisional applications in the United States.

We further assessed the main patent areas of each of the top 10 assignees according to Table 3. The result is presented in Table 4 and shows that these top 10 assignees filed few provisional applications in the Drugs and Medical category. Basically, except for GE, the top 10 assignees according to Table 3 are not in the Drugs and Medical related industry. Because applicants in the Drugs and Medical category exhibited the highest rate among the six categories for filing provisional applications in the United States, therefore, it is not surprised that the top 10 assignees filed few provisional applications in the United States.

**Table 2** ANOVA for all categories

(I) VAR00007	(J) VAR00007	Mean difference (I-J)	Std. error	Sig.	95 % Confidence interval for mean	
					Lower bound	Upper bound
Chemical	Computers and Communications	.05176	.01517	.055	-.0007	.1042
	Drugs and Medical	-.23276*	.01517	.000	-.2852	-.1803
	Electrical and Electronic	.11290*	.01517	.000	.0605	.1653
	Mechanical	.08462*	.01517	.000	.0322	.1370
	Others	-.00008	.01517	1.000	-.0525	.0523
Computers and Communications	Chemical	-.05176	.01517	.055	-.1042	.0007
	Drugs and Medical	-.28452*	.01517	.000	-.3369	-.2321
	Electrical and Electronic	.06114*	.01517	.012	.0087	.1136
	Mechanical	.03286	.01517	.464	-.0195	.0853
	Others	-.05183	.01517	.054	-.1042	.0006
Drugs and Medical	Chemical	.23276*	.01517	.000	.1803	.2852
	Computers and Communications	.28452*	.01517	.000	.2321	.3369
	Electrical and Electronic	.34566*	.01517	.000	.2932	.3981
	Mechanical	.31738*	.01517	.000	.2650	.3698
	Others	.23268*	.01517	.000	.1803	.2851
Electrical and Electronic	Chemical	-.11290*	.01517	.000	-.1653	-.0605
	Computers and Communications	-.06114*	.01517	.012	-.1136	-.0087
	Drugs and Medical	-.34566*	.01517	.000	-.3981	-.2932
	Mechanical	-.02828	.01517	.630	-.0807	.0241
	Others	-.11297*	.01517	.000	-.1654	-.0606
Mechanical	Chemical	-.08462*	.01517	.000	-.1370	-.0322
	Computers and Communications	-.03286	.01517	.464	-.0853	.0195
	Drugs and Medical	-.31738*	.01517	.000	-.3698	-.2650
	Electrical and Electronic	.02828	.01517	.630	-.0241	.0807
	Others	-.08470*	.01517	.000	-.1371	-.0323
Others	Chemical	.00008	.01517	1.000	-.0523	.0525
	Computers and Communications	.05183	.01517	.054	-.0006	.1042
	Drugs and Medical	-.23268*	.01517	.000	-.2851	-.1803
	Electrical and Electronic	.11297*	.01517	.000	.0606	.1654
	Mechanical	.08470*	.01517	.000	.0323	.1371

\* The mean difference is significant at the .05 level

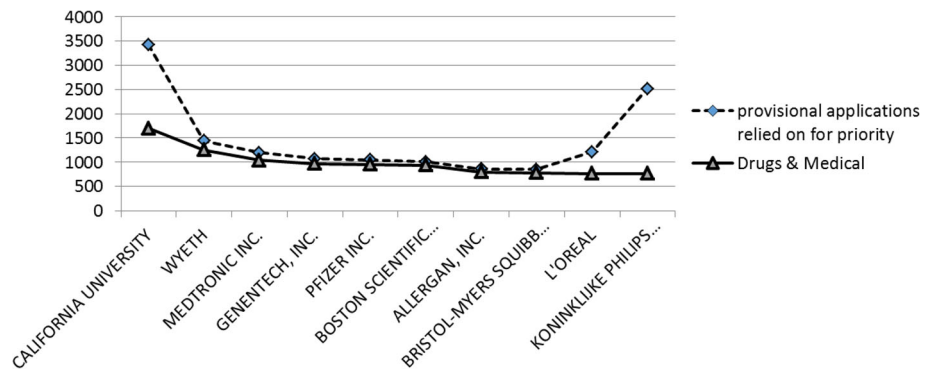
We further investigated the applicants' filing behavior in the Drugs and Medical category by reviewing the provisional applications that were relied on for claiming priority filed by the top 10 assignees in the Drugs and Medical field each year between 2005 and 2014 and provisional applications in all six categories that were relied on for claiming

**Table 3** Top 10 assignees who filed the most nonprovisional applications in the United States for 2005–2014, their corresponding provisional applications, and their PA to NPA ratios

Assignee	Nonprovisional applications	Provisional applications relied on for priority	PA to NPA ratio (%)
Samsung	55,344	3253	5.88
IBM	53,761	868	1.61
Canon	30,534	39	.13
Microsoft	28,887	2675	9.26
Toshiba	21,874	1511	6.91
Hon Hai Precision	21,210	12	.06
Sony	20,720	623	3.01
Fujitsu	20,049	198	.99
Seiko	15,351	51	.33
GE	14,450	912	6.31

**Table 4** Provisional applications filed by the top 10 assignees according to Table 3 in the United States for 2005–2014 according to technological category

Assignee	Chemical	Computers and Communications	Drugs and Medical	Electrical and Electronic	Mechanical	Others
Samsung	29	2549	13	393	34	235
IBM	23	524	13	238	18	52
Canon	0	13	1	13	10	2
Microsoft	2	2037	2	123	19	492
Toshiba	62	630	3	82	697	37
Hon Hai Precision	0	2	0	9	0	1
Sony	6	357	2	116	5	137
Fujitsu	1	170	0	11	1	15
Seiko	0	34	2	7	2	6
GE	144	245	73	257	116	77



**Fig. 7** Provisional applications that were relied on for claiming priority filed by the top 10 assignees in the Drugs and Medical field each year for 2005–2014 and provisional applications in all six categories that were relied on for claiming priority filed by each of the top 10 assignees each year for 2005–2014

priority filed by each of the top 10 assignees each year between 2005 and 2014. The result is presented in Fig. 7 and shows that except for California University and Koninklijke Philips Electronics N.V., the filing numbers of provisional applications in the Drugs and Medical were highly similar to the filing numbers of provisional applications in all six categories. This indicates that applicants involved in the Drugs and Medical field exhibited less diversity and focused only on one field.

## Conclusion

We determined that provisional application filings continued to rise with an increase in nonprovisional application filings between 2005 and 2014. The preference ratio remained steady. The use ratio of provisional applications was approximately 52–69 % each year between 2005 and 2014. The PA to NPA ratio can be used to evaluate the provisional application filings with respect to nonprovisional application filings according to various countries, technological categories, and assignees. An earlier filing date, a longer patent term, and an earlier promotion opportunity are regarded as factors encouraging the filing of provisional applications. Eventual higher cost in filing nonprovisional applications and additional requirements for foreign applicants are regarded as factors discouraging the filing of provisional applications.

Applicants' country of origin was a factor influencing who filed provisional applications in the United States. Applicants from East Asian countries (Japan, Korea, Taiwan, and China) were less likely to file provisional applications in the United States. By contrast, applicants from the United States, Canada, and Israel were more likely to file provisional applications in the United States.

Applicants' field of industry was a factor influencing who filed provisional applications in the United States. Applicants in the Drugs and Medical category filed more provisional applications in the United States. By contrast, applicants in the Electrical and Electronic and Mechanical categories filed fewer provisional applications in the United States.

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