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PRIZES AND PATENTS: FEMALE INNOVATION IN COLONIAL AUSTRALIA

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Prizes and Patents: Female Innovation in Colonial Australia

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Abstract

We analyse prize winners at international exhibitions held in Australia in the second half of the nineteenth century as a means of estimating the significance of female inventors. It provides an alternative measure from the more common focus on patents. While both methodologies – patents and exhibitions – have shortcomings, exhibitions appear to be more inclusive of sectors in which female inventiveness was concentrated including apparel, textiles and the creative arts. This is confirmed by the larger share of women inventors as exhibition prize-winners compared with patentees. Female patentees and prize-winners possessed similar characteristics – many were married, lived locally, and were occasional and individualist in their creative habits.

Keywords

Female inventors; Australia; international exhibitions; prize winners; creative industries; patenting.

Prizes and Patents: Female Innovation in Colonial Australia

Introduction

Women mattered in nineteenth-century technology markets. A recent and evolving literature is examining the small but growing role of women as patentees since the nineteenth century. Women clearly faced significant barriers to their participation in the patenting system including those of cost, time, business connection, and institutional bias (Bowrey 2024). Patenting, as a measure of innovation, also has its shortcomings in terms of its ability to distinguish quality and its exclusion of inventions that were difficult to patent or were considered beyond the scope of the system such as artistic design and consumer products (Griliches 1998).¹

The nineteenth-century growth of national and international exhibitions—whose motives included championing future technologies—offers an alternative measure of inventiveness and one that may have been more inclusive of women and their range of innovations. In their favour, exhibitions were largely void of barriers, in the words of Khan (2024, 942), an “unfiltered open-access registration system”. They provided wide coverage of many types of innovation including those often considered non-patentable. Exhibitions effectively promoted their exhibits thereby facilitating the spread of knowledge, while patents were designed to guard against knowledge sharing. In the process, exhibitions enabled a series of interactions including with potential financiers and buyers (Marovich 1998, 139). All of these features point to exhibitions being the next step beyond patenting in commercialising ideas. Finally, far from women being discouraged, they were often targeted as likely to bring appealing exhibits that would attract the large number of visitors desired by exhibition organisers (Khan 2024, 935).

On the other hand, exhibitions data also possesses significant shortcomings as a measure of innovation. In particular, the open access system meant a lack of quality control, which is confirmed by the derogatory comments of contemporaries about some exhibits. They were also reproving of exhibits that were presented with the main intention of seeking publicity for it or its owner. As a result, exhibits were often not very representative of key areas of innovation in an economy (Khan 2013, p.92). Exhibitions were periodic rather than continuous in nature as per patents. Information about exhibits and their exhibitors was often parsimonious since they lacked the registration requirements of the patent system.

Some of these methodological shortcomings, particularly quality measures and irregular data, may help to explain why there has been little research into exhibitions as a barometer of technical change. However, their potential utility in revealing more about female patenting has generated several important contributions (Orr 2011; Khan 2016, 2024).

¹ Although some research has addressed the issue of quality in smaller samples by calculating the length of the patent including whether renewal options were exercised. Streb et al 2006; Nuvolari & Vasta 2015.

The objective of this paper is to examine how often women won prizes at international exhibitions held in colonial Australia (Victoria in particular) in the late nineteenth century. Focussing on prizes awarded at exhibitions, rather than merely the number of exhibits or exhibitors, helps to address the criticism of quality (Brunt et al 2012; Khan 2016, 2024; Moser & Nicholas 2013). In light of the discussion of the relative merits of patenting and exhibitions as sources of female inventiveness, we then compare our results with female patenting in Australia. We find that, while still in a small minority, women's share of exhibition prizes was greater than that of patenting around the same years. The range of exhibition prizes across sectors suggests that further research on exhibitions and Australian female inventiveness is warranted.

Female inventors

In the second half of the nineteenth century, important changes were occurring in the economic role of women in many nations, which included in the workforce, business proprietorship, real estate ownership and financial investment. Related changes were occurring in their social and political lives. A series of developments underlay what has sometimes been called the emergence of the 'new woman'. Foremost, perhaps, were legal advances in the rights of women particularly with the decline of coverture that prevented married women from owning or trading in economic assets. Improved access to education advanced women's human capital, facilitated by declining fertility and the advent of compulsory elementary education in many nations that gave women more time for self-improvement and economic activities.

The growing role of women in technology markets has been the subject of recent scholarship. Much of it, like the patenting literature in general, has focussed on the nineteenth century in light of enhanced copyright laws offering protection for inventors and the development of a system for making patent applications. This work has largely focussed on the industrialising economies of North America and Western Europe, particularly the UK, USA, France, Italy, Belgium, the Netherlands, and Germany (Berger & Prawitz 2024; Donges et al 2025; Gozen 2024; Khan 2000, 2016, 2024; Marovich 1998; Martinez 2025; Merouani & Perrin, 2024a, 2024b; Wagenaar & Colvin 2025). They generally find that patent applications that included a woman grew from less than 1 per cent of the total to around 2 per cent in the nineteenth century. In addition, the role of married women increased and the range of industries in which they invented and the occupation of female patentees were both highly diverse. Results for Australia, distinguished as a southern hemisphere natural resource focussed economy, were remarkably similar though with somewhat different industry distributions of the patents in favour of mining, agriculture and the household (Fleming et al 2025).

By contrast, very little has been written about female involvement in exhibitions. Several papers have looked at female exhibitors in France, the US, the UK and Australia, although the focus of most of this research has been the female exhibitors or prize

applicants rather than the prize winners themselves.² While exhibitions and prizes were open to most people, as noted above, their inclusiveness was also one of their drawbacks – they lacked the novelty requirements of the patent system. Therefore, we build on this small literature by focussing on female prize winners at exhibitions and specifically on prize winners in general exhibition categories where prizes could be awarded to male and female exhibitors. This provides some measure of quality beyond the proportion or total exhibits from females within an environment suited to women's diverse innovation habits.

The Exhibition Movement

The second half of the nineteenth century witnessed the organisation of regular national or international exhibitions, sometimes referred to as world fairs or expositions. They were generally motivated by a mixture of aims including demonstrating national and imperial achievements as well as giving prominence to emerging and future technologies, design and consumer products. In the process they promoted trade and industry and became symbols of modernism in a globalising age (Frost et al, 2017, 21). The Great Exhibition in London in 1851 is generally regarded as the foundation of the international exhibition movement, although regular national expositions were held in France in the first half of the nineteenth century (Carpenter 1972). Held in the impressive Crystal Palace building made of glass and steel it attracted widespread media attention and over 6 million visitors and also caught the attention of the royal family (Auerbach 1999). The idea was soon taken up by other countries particularly the USA, France, Italy, Austria, Spain, Belgium and Portugal. In the USA exhibitions were perceived as reinforcing the country's 'manifest destiny' and were often timed to celebrate major milestones in the country's history.

Half a century after the Great Exhibition, the Exposition Universelle in Paris in 1900 attracted 50 million visitors, a figure great than the French population of the time (Greenhalgh 2011, 28). It embraced haute couture and art nouveau, which indicated the breadth of innovation that now included the fine arts (Frost et al 2017, 29). Clearly, women were foremost in what one scholar has referred to as 'an occasion for instruction in progressive, patriotic consumption' (Wilson 1991, 149). The important contributions from women were recognised much earlier with the introduction of a 'Ladies Court' or separate buildings set aside for women's exhibits. The Ladies Court was first introduced by the 1876 Philadelphia Exhibition and in 1900 a Women's Exhibition was held in London (Marovich 1998, 135; Khan 2024, 936).

Australian state-based or intercolonial exhibitions, involving all of the Australasian colonies, were held in Sydney and Melbourne from the 1850s to the 1870s. These were often viewed as preparation for larger international events held overseas in subsequent years. The first international exhibitions held in Australia were in Sydney (1879) and

² Although Khan (2016) also reports winners of prizes and awards for national expositions in France in the first half of the nineteenth century.

Melbourne (1880 and 1888).³ These international exhibitions were much larger and bolder gatherings based on overseas experience that attracted attendance from much of the colony (Orr 2011). They were organised in a grand setting in the Garden Palace (Sydney) and the Royal Exhibition Hall (Melbourne). Their scope was much broader than the largely agricultural focus of the early intercolonial events. Orr compares female participation at the first three international exhibitions in Australia (1879-88) with a similar assessment by Greenhalgh of five Paris expositions in 1855, 1867, 1878, 1889 and 1900. She finds that the participation of Australian women at the Australian exhibitions was significantly higher than women from 11 leading nations at the Paris events. The share of women exhibitors was 11.3 to 13.8 per cent in Australia compared with 4.4 to 8.4 per cent for the Paris exhibitions (Orr 2011).⁴ The differential was even greater when focussing on women artists in the fine arts court, 18.6 to 23.5 per cent compared with 3.9 per cent (Orr 2011). Orr observes that ‘women from all walks of life were included as spectators, exhibitors, and consumers, comprising approximately fifty per cent of the audience’. Many may have been acclimatised to present their exhibits to large public audiences from the prior experience of the intercolonial exhibitions. She concludes by suggesting a link between higher female participation than in Europe and their access to the franchise in Australia as part of a broader trend of earlier entrance into public life by Australian women.

Sources and methods

As discussed earlier, we will focus on those exhibits that won prizes at the Australian exhibitions, which provides a measure of reasonable quality in order to draw comparisons with patenting that had its own set of standards and requirements. Prize exhibits were also more likely to attract attention and facilitate future research in the area (Brunt et al 2012, 660; Moser & Nicholas 2013). Questions have been raised about the standard of judging and the consistency of the criteria adopted, although some contemporary evidence points to great care taken in reaching decisions (*SMH* 18.10.1888, p. 4). In Table 1 we compare data on female prizes with total female exhibitors to show that these women had only an 11 per cent chance on average of winning a prize.

Our data is taken from the official exhibition catalogues for eight exhibitions consisting of five state or intercolonial exhibitions (1854, 1861, 1866, 1872 and 1875), and three international exhibitions (1879, 1880 and 1888). The Exhibition of Women’s Industry and Centenary Fair in 1888 was an important milestone in exhibiting and commercialising women’s inventiveness in Australia (Sear 2008). It had seven competitive departments with more than 4,000 exhibitors and was widely discussed in the contemporary media (*SMH* 18.10.1888, p. 4; 27.10.1888, p. 13; 1.11.1888, p. 5;

³ Smaller international exhibitions were held in South Australia in 1887-88 (Adelaide Jubilee International Exhibition) and Tasmania in 1891-92 (Tasmanian International Exhibition, held in Launceston).

⁴ Our calculation of female participants, excluding ladies courts, confirms Orr’s figures using this measure and provides results for the earlier state and intercolonial exhibitions of 3.5 per cent (1854), 5.3 per cent (1861).

9.11.1888, p. 3). However, we have not included it in our analysis since it is not possible to derive women's share of prizes in the absence of male exhibitors.

A prize is counted as a gold, silver or bronze medal, or a certificate that has a note stating that it is equal to a medal. Some exhibitions awarded certificates rather than medals, so we counted certificates awarded for first, second, third and for one exhibition (Sydney International Exhibition 1879) fourth. Prizes for honourable mention (or similar) are not included. Prize data is for all exhibitors (male, company or institution, or female) from Australian states and excludes prizes won by overseas exhibitors in order to be consistent with analysis on foreign exhibitions.

We exclude from our main analysis prizes won at the Ladies Jury/Ladies Court (we report this data separately). Although Ladies Court exhibits were the majority of female contributions in the three international exhibitions, concerns were expressed about the quality of these exhibits (Orr 2011). We believe excluding them provides some quality assurance and a better means of comparing directly with male exhibits in the general categories. Prizes are counted if they were won in a general category at the exhibition, but we excluded categories associated with food (for example, meat, fish, olive oil, bottled fruit, preserves), beverages (for example, tea, coffee, hops, beers, ales, wine, spirits), agricultural products (such as grains, cereals, pulses), animals and livestock, wool, and mineral products (such as coal).

Patent data was collected from the *Victorian Government Gazette*, 1868-1904. Patent data comprises the full name and occupation, address of applicant, date of application, and a description of the patent. The data was coded by name, occupation, town, state and country, date, and industry of patent.

In total, the data comprises 91 female prize winners and 214 female patent applications.

Prize winning women

Table 1 summarises the total number of prizes for general competition categories and the number and share won by female exhibitors. We collected information on 2,795 prizes awarded to Australian exhibitors for eight exhibitions held between 1854 and 1888. Across the eight exhibitions, the average female share is 3.3 per cent. All of the exhibitions are within the 1.9-4.4 per cent range except for the 1872 Melbourne exhibition at 7.9 per cent. We have no explanation for this apparent outlier. Our results are similar to Orr's calculation of the female share of all exhibitioners (3 to 5 per cent), although that calculation includes non-general categories that we excluded (as explained in section 4)(Orr 2011). Our only direct international comparison of the share of female prize winners is for France in the first half of the nineteenth century. These provide similar results with an average of 3.4 per cent of medals awarded to women and in the region of 2 to 4 per cent in most years with several outliers. (Khan 2016, 185).⁵

⁵ The definition appears to be slightly different including honourable mentions

TABLE 1 ABOUT HERE

We compare the female share of exhibition prizes with that for patents (Figure 1). The prize-winning average of 3.3 per cent across all eight exhibitions is above the female patent share for any year or any grouped average across a series of years. Thus, the patent average for 1868-79 and 1880-9 were both 0.8 per cent, which is well below the prize rate for the exhibitions of 1872, 1875, 1879, 1880 and 1888 of 7.9, 2.7, 3.0, 1.8 and 2.3 per cent respectively.

FIGURE 1 ABOUT HERE

One of the key motivations for studying women's contributions towards the exhibitions is to see if it reveals a different spread of innovations from their patenting experience. We allocate our female prizes and patents to a set of industry classifications developed by Khan (2023, 941), which we modify to include the mining sector in order to reflect the importance of this activity in Australia (Table 2). Prizes were concentrated among three industry categories – Arts & Education (60 percent), Apparel (21 percent) and Textiles (in particular, silk) (13 percent). The types of prizes to be found in Arts & Education and Apparel were mainly associated with design features of works of art (for example, paintings, shell work, wool work, artificial flowers) or apparel design (for example, embroidery, point lace), although they also included specific apparel (for example, hosiery, stays, underclothing).

TABLE 2 ABOUT HERE

Female patents were more broadly distributed across sectors but with 52 per cent to be found in three sectors - Household & Building (33 per cent), Machines, Engines and Transport (11 per cent), and Metallurgy (8%). These areas received almost no prizes at exhibitions, indicating that women likely chose to patent these innovations rather than display the innovation to the wider public at exhibition. However, there were very few patents in Arts & Education and in Textiles, which indicates that including prizes in an analysis of female inventing reveals that the range of innovation in which women were involved was wider than previously thought.

Similar amounts of female innovation occurred in Apparel for prizes (21 per cent) and patents (16 per cent). However, while prizes focussed on design elements as noted above, patents included tools and equipment such as pattern drafting, and dress dummies. This division within Apparel suggests that women were aware of the alternative avenues for promoting and developing their innovations – tools could

generally be more easily protected by patents than designs that presumably were quite easy to copy, and so the best strategy for latter might be to publicise them to attract customers. Moreover, the fact that we found no overlap between individual prizes and patents further suggests that women understood these could be alternative rather than complementary outlets for their creativity.⁶ That there were also no individuals who appeared on both the prizes and patents lists, however, might intimate that these were two distinct groups of women.⁷ The range of innovations across patents compared with prizes suggests that women, while motivated both by creations that were life improving and had commercialisation potential, understood that the former was often best placed in exhibitions and the latter patented.

We have no comparative evidence of the distribution of female prizes but can refer to evidence of total female patentable and unpatentable innovations for a similar period for France, the UK and the US, where unpatentable refers to innovations presented to exhibitions and prize awarding bodies (Khan 2024, 941) and female exhibits for Australia (Orr 2011 Table 5). Arts & Education was dominant (86 per cent) in unpatentable innovations for Britain. For the US, there was a fairly even spread among Arts, Apparel and House/building. In France there was a broader spread across sectors with textiles the largest. For each of these three countries patents were more strongly oriented towards machines, industrial, chemicals, and household/building. Orr uses a different classification by drawing on the large number of categories in the catalogues. She finds, nonetheless, that the main areas of female exhibits are focussed on art and design including paintings, drawings, lace, leatherwork and jewellery. These results reaffirm that including both patentable and non-patentable innovations provides a broader perspective on women's technological role.

What types of women won prizes?

Since exhibitors and patentees appear to have been two separate groups of women, what can we say about the nature of these two cohorts that helps us to understand more about their work. In particular, we look at their locality, marital status, regularity of invention, and whether they operated individually or as part of a group. Each of these features tells us something about how and where they sourced and developed their expertise.

In analysing the geographic location of female patentees and exhibitors we have excluded the Sydney exhibition to focus on Victoria for consistency. Thus, we are comparing females that chose to exhibit in Victoria with females that chose to patent in Victoria (Table 3). In both cases, a large majority of women came from Victoria, although to a greater extent amongst exhibitors (90 per cent) compared with patentees (76 per cent). 19 per cent of patentees came from New South Wales but only 1 per cent

⁶ Some patents were exhibited but none won prizes. In the women's section of the 1876 Philadelphia Exhibition there were 79 exhibits of which 59 were patented. Marovich 1998, p. 138.

⁷ Admittedly, while focussed on Victoria over similar timeframes, these are small sample sizes and so it is quite possible that there were overlaps in personnel. As noted in the above footnote, exhibits were often patented in other countries.

of exhibitors. This may have reflected a different cost-benefit calculation for the two activities. Some NSW patentees may have registered their patent in Victoria to protect it, while fewer exhibitors may have seen value in travelling nearly 900km from Sydney to Melbourne to participate. Thus, the patent system encouraged a wider geographic distribution of innovation than did the exhibitions. By contrast, in their study of the Royal Agricultural Society (1839-1939) in Britain, Brunt et al (2012, 666) concluded that, 'prize winners and the shows were geographically dispersed'.

TABLE 3 ABOUT HERE

The marital status of patent applicants is reported in Table 4. While women endured prejudicial treatment in various aspects of their lives, married women faced additional impediments. Coverture practices were designed to subsume women's economic assets into those of her husband's and they were restricted from conducting economic and business transactions (Bishop 2015). Coverture was gradually prohibited through a series of laws in Victoria in the late nineteenth century, particularly in 1882. While some married women managed to circumvent coverture prior to its legal abolition, it appears to have made a difference to level of their economic activity overall (Fleming et al 2025). We know the marital status of nearly a third of our female patentees, of whom 62 per cent were married. We do not know the marital status of any of our women prize winners though we may draw some inferences from their use of titles (Mrs, Miss). Married women, therefore, were also in the majority among prize winners and in a similar ratio of 2.95 compared with 3.08 for patentees. Khan's (2016, 187-8) analysis of female prize winners in France in the first half of the nineteenth century finds somewhat more widowed (40 per cent) than married (34 per cent) women although the opportunities available to the latter may have been more constrained earlier in the century.

TABLE 4 ABOUT HERE

Several examples serve to illustrate the range of exhibits with which married women were involved. At the 1872 Melbourne Exhibition Mrs Thomas Lang of Elizabeth St Melbourne exhibited a domestic washing table called "Mrs Lang's Patent Economical Domestic Washing Table" for which she received an honourable mention. It claimed to combine cheapness, ease of working, a saving of soap and other materials used in washing, and only required cold water. In 1875 Mrs Fanny Milton exhibited the following: Life Buoy, Swimming Belt, Life Belt & Sheets of Cork. At Sandridge, now Port Melbourne, on the edge of Port Philip Bay where she lived, these would have been valuable pieces of equipment. Finally, at the 1888 Melbourne Exhibition, Mrs E. K. Atkinson of Melbourne received a 2nd (or Silver) prize for "Stays & like appliances" in the Surgical Instruments & Appliances section.

The occupation of women is difficult to ascertain. There is no information provided in the exhibition records. We know the occupation of about 20 per cent of female patentees. Those with work outside the home were spread across a range of occupations, particularly professional and retail roles such as nurse, teacher and clothing related. Matching patents to occupation we find, perhaps not surprisingly, that it was common for women to patent in areas relevant to their work. We know very little about the social background of female exhibitors and patentees. However, women patentees used the terms gentlewoman or lady as often as married to describe their status. This may tentatively point to conclusions similar to overseas research that while the background of female inventors was quite widespread, many were from educated, privileged if not elite backgrounds (Berger & Prawitz 2024, appdx, 1187, Gozen 2024, p. 5; Khan 2024, 940).

While many of our patentees may have worked in areas relevant to their inventions, few could be considered regular patentees or professional inventors. 90 per cent made only one patent application and a further eight per cent two. We find a very similar result for prize winners, of whom 93 per cent are only recorded as receiving a single prize and another 6 per cent just two prizes (Table 5). The largest group of British, French and American patentees made only one application although this was less concentrated than in Australia; for example, 36 per cent of French women patented only once (Khan 2024, 936).

TABLE 5 ABOUT HERE

These results seem to be confirmed by the fact that women rarely invented with other people. 96 per cent of prizes and 93 per cent of patents were individual activities involving no other person (Table 6). On the few occasions where prizes were jointly won, this was with a family member. By contrast, most joint patents were with an unrelated male, who perhaps may have been involved in co-designing the patent (e.g. as an employee), provided finance or advice on the application procedure. Individual inventing was also predominant in Britain, France and the USA (Khan 2024, 936). In other words, inventive activity, whether it be prizes or patents, were something that women pursued only occasionally and by themselves. They were generally not part of inventive networks and this may distinguish them from male inventors. While they may not have been regular, 'professional' or networked inventors, they acted independently, their achievements being their own.

TABLE 6 ABOUT HERE

Prizes at the Ladies Court

As indicated in section 4, we kept data on the Ladies Court prizes separate from our main analysis in order to provide a clearer comparison with men who were naturally excluded from this area of the exhibition. We collected data for the Ladies Court in the Exhibitions of 1879 and 1880 for which it was especially important (Orr, Table 4).

We find a different pattern of women by marital status, using the proxy of titles again. 54 per cent were unmarried compared to 31 per cent married, a married to unmarried ratio of 0.56. It may be the case that the Ladies Court provided a better environment for unmarried woman to present their innovations compared with the general categories. Or perhaps the Ladies Court was open to different types of innovations more suited to unmarried females?

Ladies Court prizes were similar to general category prizes, with several exceptions (Table 7). Textiles (Silk) was 13 per cent of general prizes and 0 per cent for the Ladies Court, while Household & Building was 28 per cent for the Ladies Court and just 1 per cent for general prizes. The Ladies Court prizes awarded to exhibits in the Household & Building category, included household items such as cushions, pillow lace, fret-work, picture frames, quilts and curtains. The Ladies Court perhaps allowed women to display design work suitable for the home in an environment that was more accepting of this work than the general household and building categories that focused on more utilitarian or functional items such as furniture.

TABLE 7 ABOUT HERE

Most prize winners were again geographically concentrated in Victoria although slightly more of the Ladies Court made the trip over from Tasmania (14 versus 7 per cent) than did in other parts of the exhibitions (Appendix Table 1). We also find that, akin to the other parts of the exhibition and to patentees, prize winners in the Ladies Court overwhelmingly won only a single prize and did so individually (Appendix Tables 2, 3).

Why did women participate in Exhibitions?

The process of applying to be an exhibitor at one of the Australian exhibitions would have been lower cost and more straightforward than applying for and obtaining a patent. Women may also have been more at home in an environment that did not appear to give most recognition to more functional scientific advances commonly associated with masculine areas of research. Women may also have been attracted by the prospect of a female only environment in the Ladies Court. Indeed, some feminists of the period saw exhibitions as an opportunity for a rallying cry for the contribution of women to innovation, science, and the creative arts (Marovich 1998, 286; Sear 2008). As Orr, writing about Australia, has noted:

“Feminists and reformers, concerned with expanding and protecting women’s rights, organized exhibits of women’s inventions at trade shows and fairs, and wrote numerous booklets and articles that focused more public attention on the expanding opportunities for women” (2011, 145-6)

However, it would also have been good business sense by these women. Innovations in arts and design were often for sale to consumers, not a patent to be protected and exercised by oneself or an assignee. Therefore, a demonstration in front of large numbers of exhibition visitors – potential customers – represented a mass advertising opportunity added to which winning a prize would help secure the exhibitor’s reputation and future sales prospects. In a similar fashion, unpatented innovations by women were much more heavily oriented towards consumer final products and design innovations than men in the UK (93 versus 54 per cent) and the US (78 versus 16 per cent) (Khan 2024, 947). Women may also have seen exhibiting as an opportunity to raise finance for existing or proposed innovation research given that they generally had fewer financial resources personally and less access than men to established financial networks. Overall, exhibition prizes confirm that women often entered innovation with a view to commercial benefit not only to improve the domestic lives of themselves and others. Indeed, Khan may be accurate in concluding that women exhibitors “were directed, to an even greater extent than their patenting, towards production and commercialisation (Khan 2016, 185).

Conclusions

At the beginning of the paper we hypothesised that investigating female inventiveness through their presence at exhibitions might give a fuller more encompassing picture of their contributions than contained in the growing patents literature. Using prizes as a better measure of quality than mere participation as exhibitors, we revealed that women contributed a larger share of innovation through exhibitions than through patenting. This also revealed a different set of women from the patentees and whose expertise often lay in alternative fields; in the case of prizes more commonly in the creative arts and design.

Our research therefore shows that, taken as a whole, women were innovators across a wide range of fields, some more commercially-oriented than others and recognising that patents (protection of knowledge) and exhibitions (promotion and sale of creative inventions) played very different roles in the innovation system.

Although different cohorts, we found that female prize winners and patentees possessed many similar qualities especially that they were occasional and individualist contributors to innovation. Most came from the locality although somewhat more female patentees were interstate reflecting a desire to protect an invention across the two major jurisdictions of colonial Australia. Married women were somewhat more active than other women at a time when the obstacles associated with coverture were gradually being withdrawn.

Finally, we also looked separately at the distinct female-only sections, which were becoming common among the later exhibitions. These 'ladies' shared similar traits to other prize winners although there was a greater share of unmarried women and more focus on household innovations.

Drawing close comparisons with other nations is hindered by the lack of extensive research. Those few researchers have focussed on exhibitors, or prize applicants and Khan's (2016) study of French female prize-winners is for the first half of the nineteenth century. We await future research on other countries along the lines of our paper.

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Table 1. Female Prizes at Exhibitions, 1854-1888

Exhibition	Date	Total Prizes	Female Prizes	Female Prize share (%)	Number of Australian Female Exhibitors	Female Prizes / Female Exhibitors
Melbourne Exhibition	1854	104	2	1.9	13	15%
Melbourne Exhibition	1861	244	10	4.1	37	27%
Intercolonial Exhibition	1866	410	18	4.4	--	--
Melbourne Exhibition	1872	191	15	7.9	42	36%
Melbourne Exhibition	1875	187	5	2.7	109	5%
Sydney Exhibition	1879	659	20	3.0	196	10%
Melbourne Exhibition	1880	445	8	1.8	135	6%
Centennial International Exhibition	1888	555	13	2.3	316	4%
Total		2,795	91	3.3	848	11%

Notes: Prizes are counted if they were won at a general category at the exhibition, excluding prizes categories associated with food (e.g. meat, fish, olive oil, bottled fruit, preserves), beverages (e.g. tea, coffee, hops, beers, ales, wine, spirits), agricultural products (e.g. grains, cereals, pulses), animals and livestock, wool, and mineral products (e.g. coal).

Prize = Gold, Silver or Bronze Medal, or a Certificate that has a note stating that it is equal to a medal. Prizes are for all Australian states only; excludes prizes won by overseas exhibitors. All data excludes prizes won at the Ladies Jury/Ladies Court.

Figure 1. Female Contribution to Innovation (Percent of Prizes & Patents), 1854-1903

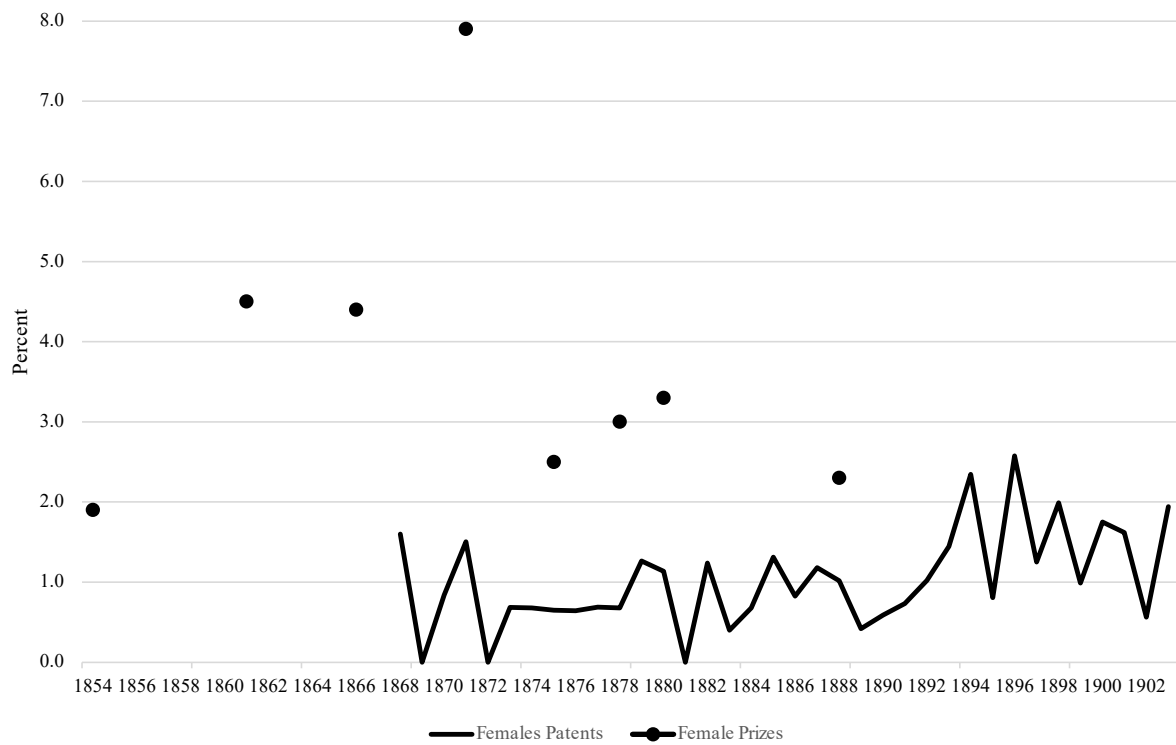


Table 2. Distribution of Prizes and Patents by Industry 1854-1903

Industry	Number of Prizes	Percent	Number of Patent Applications	Percent
Agriculture	1	1	12	6
Apparel	19	21	34	16
Arts & Education	55	60	9	4
Chemicals & Medical	2	2	13	6
Food	0	0	12	6
Household, building	1	1	70	33
Industrial	0	0	9	4
Machines, engines, trspt	0	0	23	11
Metallurgy	0	0	17	8
Miscellaneous	1	1	12	6
Textiles	12	13	3	1
Total	91	100	214	100

Table 3. Female Prize Winners & Patent Applicants by Location (Melbourne Exhibitions only)

	Prizes	Percent	Patent	Percent
Victoria	64	90	128	78
New South Wales	1	1	32	19
Queensland	0	0	2	1
South Australia	1	1	2	1
Tasmania	5	7	0	0
Western Australia	0	0	1	1
Total	71	100	165	100

Table 4. Marital Status of Patent Applicants

	Number of Patents	Percent
Married Woman	40	19
Gentlewoman	35	16
Spinster	13	6
Widow	12	6
Lady	5	2
	105	49
Occupation stated	42	20
No occupation stated	67	31
Total	214	100

Table 5. Regularity of Prize Winners and Patent Applicants

	Females	percent	Prizes	percent
One	78	93	78	86
Two	5	6	10	11
Three or more	1	1	3	3
Total	84	100	91	100
			Patents	
One	164	90	164	77
Two	14	8	28	13
Three or more	4	2	22	10
Total	182	100	214	100

Table 6. Individual or Joint Entries

	Prizes	Percent	Patents	Percent
Single	87	96	200	93
Joint	4	4	14	7
	91	100	214	100
Related	100%		14%	

Table 7. Prizes at the Ladies Court and the General Categories

Industry	General Categories		Ladies Court	
	Number of Prizes	Percent	Number of Prizes	Percent
Agriculture	1	1	0	0
Apparel	19	21	23	14
Arts & Education	55	60	99	58
Chemicals & Medical	2	2	0	0
Food	0	0	0	0
Household, building	1	1	48	28
Industrial	0	0	0	0
Machines, engines, transport	0	0	0	0
Metallurgy	0	0	0	0
Miscellaneous	1	1	0	0
Textiles	12	13	0	0
Total	91	100	170	100

Appendix Table 1. Ladies Court Prize Winners by Location

	Melbourne LC		Sydney LC		Total Ladies Court		Total Exhibitions	
	Prizes	Percent	Prizes	Percent	Prizes	Percent	Prizes	Percent
New South Wales	0	0	121	74	121	71	13	14
Queensland	0	0	1	1	1	1	3	3
South Australia	0	0	7	4	7	4	1	1
Tasmania	1	14	24	15	25	15	9	10
Victoria	6	86	10	6	16	9	65	71
Total	7	100	163	100	170	100	91	100

Appendix Table 2. Ladies Court. Regularity of Prize Winners

	Females	Per cent	Prizes	Per cent
One	156	96	156	92
Two	7	4	14	8
Three or more	0	0	0	0
Total	163	100	170	100

Appendix Table 3. Ladies Court - Individual or Joint Entries

	Ladies Court		Exhibitions		Patents	
	Prizes	Percent	Prizes	Percent	Patents	Percent
Single	164	96	87	96	200	93
Joint	6	4	4	4	14	7
	170	100	91	100	214	100
Related	100		100		14	