

INVESTING IN U.S. COMPETITIVENESS: The Benefits of Enhancing the Research and Experimentation (R&E) Tax Credit

“Instead of tax loopholes that incentivize investment in overseas jobs, I’m proposing a more generous, permanent extension of the tax credit that goes to companies for all the research and innovation they do ... right here in the United States of America.”

– President Barack Obama, September 8, 2010

UNITED STATES DEPARTMENT OF THE TREASURY
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Executive Summary

The Administration's proposal to enhance the Research & Experimentation tax credit will:

- **Leverage More Than \$100 Billion in Domestic Private-Sector Research over the Next 10 Years.**
- **Support Nearly 1 Million Research Workers in the U.S. in Professions that Pay Higher-Than-Average Wages.**
- **Increase the Total Amount of the Credit by 20 Percent.**
- **Increase Use of the Simpler Version of the Credit.**
- **Strengthen the Incentive Effect of the Credit by Providing Certainty to Taxpayers.**

The Research & Experimentation (R&E) tax credit encourages innovation and provides a powerful incentive for businesses to continue to invest in research projects. Investments in research and experimentation produce technological advancements that drive productivity growth and improvements in U.S. living standards. Businesses may underinvest in research, however, because they may not be able to capture the full benefit of their spending. The R&E tax credit is designed to address this underinvestment and to increase the total amount of research activity undertaken in the United States.

The credit has been extended on a temporary basis 14 times since its creation in 1981, often retroactively, and is currently scheduled to expire on December 31, 2011. When the credit lapses, the incentive effect is blunted because uncertainty about whether the credit will be available in the future makes it difficult for taxpayers to factor the credit into decisions to invest in research projects that will not be completed prior to the credit's expiration. That is why the President proposed making the R&E credit permanent in his Fiscal Year (FY) 2010 and 2011 budgets and extended the current credit through 2011 as part of the bipartisan tax agreement in December 2010.

Two years ago, the President set an ambitious goal of achieving a level of research and development that is the highest share of the economy since the space race of the 1960s – 3 percent of GDP – a commitment he re-emphasized in his State of the Union address in 2011. The R&E tax credit is a vital component of achieving this goal and helping us out-innovate our competition. This is why, in addition to making it permanent, the President proposed on September 8, 2010 to expand and simplify the credit, making it easier and more attractive for businesses to claim this credit for their research investments. This proposal was subsequently included in the President's FY 2012 Budget and should be part of the reform of our corporate tax system currently under consideration.

Benefits of the Current Research & Experimentation Credit

In its current form, the R&E credit provides:

- **A Cost-Effective Way to Encourage Research Spending.** Recent studies show that the credit produces approximately a dollar for dollar increase in current research spending and that this amount could be larger in the longer run.
- **Nearly \$9 Billion in Annual Tax Credits for Research.** In Tax Year 2008, the most recent year for which corporate tax return data are available, 12,736 corporations claimed \$8.3 billion in research credits and more than 64,000 individual taxpayers claimed \$463 million in research credits.
- **Support for High-Wage Jobs.** Approximately 70 percent of research costs that qualify for the credit are labor costs, indicating that the R&E tax credit provides valuable support for these high-tech jobs. Much of the research that takes place in the United States is done by highly skilled employees, who earn higher than average wages. According to the National Science Foundation, in 2008 the average annual wage for individuals in science and technology occupations was about \$74,950, compared to \$42,270 for all occupations.

The Administration's Proposal to Expand, Simplify, and Make Permanent the R&E Credit

The Administration's proposal to enhance the R&E credit and make it permanent will:

- **Leverage More Than \$100 Billion in Domestic Private-Sector Research over the Next 10 Years.** The Administration's proposal to expand the credit and make it permanent will provide approximately \$106 billion in credits from Fiscal Year 2012 through Fiscal Year 2021. Given that research shows the credit produces a dollar for dollar increase in research spending in the short run, the expectation is that a permanent credit would result in at least an equal increase in private-sector research spending over the next decade, all of which will occur in the United States. Research also suggests that the long-run impact of the credit could be even greater.
- **Support Nearly 1 Million Research Workers in the U.S.** The Administration's proposal for a permanent and enhanced R&E tax credit will provide an incentive for undertaking research activity in the United States. Companies receiving the credit employ nearly 1 million domestic workers conducting research.
- **Increase the Total Amount of the Credit by 20 Percent.** The Administration's proposal to increase the rate of the alternative simplified R&E tax credit from 14 percent to 17 percent will enhance the incentive to increase research activity.
- **Increase Use of the Simpler Version of the Credit.** Expanding the alternative simplified credit will make it more appealing and encourage more companies to choose the simpler version of the credit.
- **Strengthen the Credit's Incentive Effect.** A permanent R&E tax credit would improve its incentive effect by providing businesses with certainty that they can make investments in long-term research projects and benefit from the credit over the course of the project.

Introduction

Investments in research and experimentation produce the technological advancements that are an important determinant of productivity growth and improvements in U.S. living standards.¹ A large and growing body of evidence suggests that investments in research are associated with future gains in market value and profitability at the firm level, and with increased productivity at the firm, industry, and economy-wide levels.² Moreover, this body of evidence demonstrates that there are important spillover effects from research investments: research activities undertaken by one firm can increase the productivity and market value of firms in related fields. Businesses invest in research because of the possibility of reaping profits from new products and processes. However, businesses may not be able to capture the full benefits of their research spending because the knowledge it produces may be used by other businesses. As a result, the private sector may not make some investments in research that would benefit society as a whole.³ That is why we need incentives such as the R&E tax credit – to address the underinvestment in research by businesses and thereby increase the total amount of research activity undertaken in the United States.⁴

The R&E tax credit creates an incentive to undertake research by providing a tax credit based on qualified research expenses.⁵ The Internal Revenue Code defines credit eligibility in terms of the types of activities and expenses that qualify.⁶ The credit, which originally was enacted under the Economic Recovery Tax Act of 1981, is designed to encourage businesses to increase their investment in research by rewarding an increase in research spending compared to prior levels. Subsidizing this activity through the tax system is a market-based response for addressing the underinvestment in research (from a society-wide perspective), because the private sector, rather than the government, chooses the research projects and the method for conducting the research.

¹ The link between research and productivity growth is discussed in The Congressional Budget Office, “R&D and Productivity Growth,” Background Paper, June, 2005.

² See The Economic Report of the President, February 2011, for a discussion of the link between innovation and economic growth.

³ A recent review of the literature on the return to research and development (R&D) concluded that the returns to R&D are positive in many countries and usually higher than those to ordinary capital. Moreover, social returns to R&D are almost always estimated to be substantially greater than private returns. See Bronwyn H. Hall, Jacques Mairesse and Pierre Mohhnen, “Measuring the Returns to R&D,” NBER Working Paper 15622, December, 2009, at <http://www.nber.org/papers/w15622>. See also Nicholas Bloom, Mark Schankerman, and John Van Reenen, “Identifying Technology Spillovers and Product Market Rivalry”, working paper, August 2010.

⁴ The government also uses other policy tools to address underinvestment in research from society’s perspective, such as direct spending and grants for both basic and applied research and the protection of intellectual property rights through the patent system.

⁵ In addition, research expenses can be deducted in computing taxable income in the year they are paid or incurred, notwithstanding the general rule that business expenses to develop or create an asset that has a useful life extending beyond the current year must be capitalized. The deduction for research expenses is reduced by the amount of research credit claimed by the taxpayer for the taxable year or the taxpayer can elect to reduce the amount of research credit claimed.

⁶ See the Appendix for more details.

Effectiveness of the R&E Credit

One of the most important considerations regarding the use of tax incentives for research is their effectiveness at increasing the overall amount of research activity. Evaluations of the effectiveness of the R&E credit generally compare the amount of research induced by the credit to the loss in tax revenue. If the ratio is greater than one, the credit is viewed as a cost-effective way to provide a subsidy to research; if it is less than one, funding the research directly would have been more cost effective.⁷

Early studies of the responsiveness of research spending to price reductions (the price elasticity) found that the price elasticity for research was substantially less than one, generally in the range of -0.2 to -0.5, implying that a one percent reduction in the price of research would eventually lead to an increase in spending between 0.2 percent and 0.5 percent.⁸ However, more recent research suggests a stronger behavioral response. Recent estimates indicate that the tax price elasticity for research spending is around -1. This means that the research credit produces a dollar for dollar increase in research spending, although some studies find larger effects.⁹ Thus, the research credit appears to be cost effective from a budgetary perspective, especially when the social return to investment is factored in. Moreover, recent studies have found that tax incentives may have a larger effect on research spending in the longer run than in the short run, presumably because research spending takes time to adjust to changes in the cost structure.

An explanation for the modest behavioral effects found in early studies of the credit may reflect the fact that it took time for taxpayers to learn about the credit and the expenditures that qualified. In addition, it likely took time for businesses to incorporate the existence of the credit into their decision-making related to R&E investments. This is consistent with the intuitive notion that tax provisions become more salient to decision makers the longer they are in effect.

The overall effectiveness of the current credit may be negatively affected by the fact that it has been perceived as temporary, which makes it difficult for firms to factor in its effect on long-term research projects and research projects with long lead times. The R&E credit has been extended by Congress 14 times since its creation in 1981, often retroactively, and was allowed to lapse for a period (between June 30, 1995 and July 1, 1996) without retroactive application upon reinstatement. The credit is currently scheduled to expire on December 31, 2011. When the credit lapses for a

⁷ Ideally, the credit's effectiveness would be measured by whether the activity it encouraged is more beneficial to society than the activities discouraged by the additional resources (e.g., taxes) used to fund the credit.

⁸ See GAO, "The Research Tax Credit Has Stimulated Some Additional Research Spending", GAO/GGD-89-114, September 1989.

⁹ Recent surveys include Bronwyn Hall and John Van Reenen, "How Effective Are Fiscal Incentives for R&D? A Review of the Evidence," *Research Policy*, Vol. 29, 2000 and Robert D. Atkinson, "Expanding the R&E Credit to Drive Innovation, Competitiveness, and Prosperity", *Journal of Technology Transfer*, Vol. 32, 2007.

period of time, the incentive effect is blunted because of the uncertainty about whether the credit will be available in the future.

Use of the Credit

In Tax Year 2008, the most recent year for which corporate tax return data are available, 12,736 corporations claimed \$8.3 billion in research credits.¹⁰ In addition, 64,000 individual taxpayers claimed \$463 million in research credits.

Table 1 shows the amount of the credit claimed by corporations in Tax Year 2008 by industry sector. It shows that corporations in the manufacturing sector accounted for about 43 percent of all corporations claiming the credit. Those manufacturers claimed almost 69 percent of the total dollar amount of credits.

Table 1. Corporations Claiming Research and Experimentation Tax Credit: Tax Year 2008

Industry	Number of Returns	R&E Credits Claimed [\$1000s]	Number of Returns as Percent of Total	Amount Claimed as Percent of Total
All Industries	12,736	8,303,369	100.0%	100.0%
Manufacturing	5,420	5,758,082	42.6%	69.3%
Information	1,132	944,284	8.9%	11.4%
Professional, scientific, and technical services	3,932	787,671	30.9%	9.5%
Wholesale and retail trade	865	430,098	6.8%	5.2%
Finance and insurance	237	142,599	1.9%	1.7%
Management of companies (holding companies)	276	62,091	2.2%	0.7%
Utilities	129	48,855	1.0%	0.6%
Various services	194	43,942	1.5%	0.5%
Mining	36	29,997	0.3%	0.4%
Administrative/ Support & waste mgmt. services	288	22,373	2.3%	0.3%
Transportation and warehousing	58	10,593	0.5%	0.1%
Construction	56	10,278	0.4%	0.1%
Real estate, rental, and leasing	30	7,453	0.2%	0.1%
Agriculture, forestry, fishing, and hunting	83	5,054	0.7%	0.1%

Source: Internal Revenue Service at <http://www.irs.gov/taxstats/article/0,,id=164402,00.html>

¹⁰ Corporations included in this count are C corporations, i.e., corporations subject to an entity level tax. Tax credits earned by corporations that are not subject to an entity level tax, such as S corporations, flow through to their shareholders and are claimed on the shareholder's individual income tax return. The same is true for tax credits earned by partnerships, which flow through to the partners.

Table 2 shows that within the manufacturing sector, three subsectors – computer and electronic product manufacturing, chemical manufacturing (including pharmaceuticals), and transportation equipment manufacturing – accounted for 78 percent of the total amount of R&E credits claimed by the manufacturing sector.

**Table 2. Manufacturing Corporations Claiming the R&E Tax Credit:
Tax Year 2008**

Industry	Number of Returns	R&E Credits Claimed [\$1000s]	Number of Returns as Percent of Total	Amount Claimed as Percent of Total
All Manufacturing	5,420	5,758,082	100.0%	100.0%
Computer and electronic product manufacturing	1,319	1,812,225	24.3%	31.5%
Chemical manufacturing	701	1,489,383	12.9%	25.9%
Transportation equipment manufacturing	291	1,180,968	5.4%	20.5%
Machinery manufacturing	651	339,851	12.0%	5.9%
Miscellaneous manufacturing	575	279,958	10.6%	4.9%
Electrical equipment, appliance, and component manufacturing	555	217,724	10.2%	3.8%
Petroleum and coal products manufacturing	40	99,858	0.7%	1.7%
Food manufacturing	163	80,719	3.0%	1.4%
Fabricated metal product manufacturing	457	74,863	8.4%	1.3%
Paper manufacturing	58	64,226	1.1%	1.1%
Primary metal manufacturing	116	32,098	2.1%	0.6%
Plastics and rubber manufacturing	202	31,366	3.7%	0.5%
Beverage and tobacco product manufacturing	18	12,844	0.3%	0.2%
Nonmetallic mineral product manufacturing	70	12,283	1.3%	0.2%
Furniture and related product manufacturing	70	11,240	1.3%	0.2%
Textile mills and textile product mills	22	5,249	0.4%	0.1%
Wood product manufacturing	14	5,016	0.3%	0.1%
Printing and related support activities	38	4,417	0.7%	0.1%
Apparel manufacturing	55	2,315	1.0%	0.0%
Leather and allied product manufacturing	6	1,478	0.1%	0.0%

Source: Internal Revenue Service at <http://www.irs.gov/taxstats/article/0,,id=164402,00.html>

Much of the research that takes place in the United States is done by highly skilled employees, who earn higher than average wages. According to the National Science Foundation, in 2008 the average annual wage for individuals in the science and technology occupations was about

\$74,950, compared to \$42,270 for all occupations.¹¹ Moreover, approximately 70 percent of qualified research costs are labor costs, indicating that the R&E credit provides valuable support for these high-tech jobs.

Considerations that May Limit the Effectiveness of the Credit in the Past

Uncertainty about the credit's temporary nature and the complexity of calculating it have potentially limited the incentive effect of the R&E credit. These both are areas that the Administration's proposal seeks to address.

1. Uncertainty Caused by the Credit's Temporary Status

As noted above, while still effective, the ability of the current credit to stimulate research may be diminished by the fact that it has been perceived as temporary, which makes it difficult for businesses to factor in its effect when planning research projects. The pattern of an off-and-on tax credit for research increases the uncertainty that firms face about the ultimate after-tax costs they will pay for research activity. This uncertainty can have a negative effect on the total amount and composition of research activity, which is by its nature a highly uncertain investment. The temporary nature of the credit may especially reduce the incentive it provides for the kinds of projects that are long term and require continuing expenditures over many years. For such projects, uncertainty about whether the credit will be available increases the financial risk of the project and weakens the investment incentive. Moreover, many projects have long planning stages, further complicating a company's analysis.

2. Complexity of Credit Calculation

The concept of a tax credit tied to increases in research activity enjoys widespread support, but the credit's design adds a layer of complexity to claiming it. The research and experimentation credit was designed to be an incremental tax subsidy, meaning that firms earn a credit only for their research expenses that exceed a defined base amount.¹² The purpose of this design is to target the tax benefit to research that would not have been undertaken absent the credit. Incremental credits can be more effective per dollar of revenue cost in achieving that goal than "flat" credits, i.e., credits offered at a fixed rate on every dollar of qualified research spending.

¹¹ National Science Board, Science and Engineering Indicators 2010, Table 3-15, referenced at <http://www.nsf.gov/statistics/seind10/pdf/seind10.pdf>.

¹² The credit available for energy research is an exception. It applies to all qualified energy research spending, that is, the credit is not incremental and there is no base amount.

Currently, a business must choose between two alternative formulas for calculating its R&E credit: an outdated formula that provides a 20 percent credit rate for research spending over a certain base amount related to the firm's historical research intensity, and a much simpler formula that provides a 14 percent credit in excess of a base amount reflecting its recent research spending.¹³ As noted above, the rationale for having a base amount is to approximate what a firm might have spent on research in the absence of the credit.

More specifically, the "regular" research credit is 20 percent of qualified research expenses above a base amount that is the product of the taxpayer's "fixed base percentage" and the average of the taxpayer's gross receipts for the four preceding years. The taxpayer's fixed base percentage generally is the ratio of its research expenses to gross receipts for the years 1984 to 1988. The base amount cannot be less than 50 percent of the taxpayer's qualified research expenses for the taxable year.

The regular credit formula, which determines the base amount with reference to the firm's research intensity (the ratio of its research spending to gross receipts) in the 1984 to 1988 period, clearly is outdated. There is little reason to believe that the firm's ratio of research spending to gross receipts from more than two decades ago, when multiplied by its average gross receipts over the prior four years, is an appropriate base for the taxpayer. In the context of a permanent R&E credit, that base amount will become increasingly irrelevant and arbitrary.

Further, this outdated formula creates complexity for taxpayers. For example, taxpayers that have sold or acquired businesses may have difficulty substantiating and documenting credit claims because the credit's structure relies on a taxpayer's research expenditures and gross receipts for the period from 1984-1988. As time passes, it becomes more difficult for firms to acquire accurate data for that period, particularly in response to changes in the interpretation and application of the statutory requirements. Thus, the regular credit creates compliance challenges for taxpayers and enforcement challenges for the Internal Revenue Service (IRS).

Taxpayers can elect the alternative simplified research credit (ASC), which is equal to 14 percent of qualified research expenses that exceed 50 percent of the average qualified research expenses for the three preceding taxable years. The simplified credit uses a base amount that more appropriately tracks the firm's recent research experience since the credit is available for research expenses that exceed 50 percent of the firm's average research spending for the prior three years.

¹³ The R&E tax credit also provides a credit for 20 percent of basic research payments in excess of a base amount and payments to an energy research consortium for energy research.

The advantage of this base is that it is updated annually and thus more accurately reflects the current state of a firm's operations.¹⁴

The Administration's Proposal to Enhance the R&E Credit

The President has proposed to enhance the R&E credit by:

- **Making the R&E Credit Permanent.** The President proposed in his FY 2012 Budget to permanently extend the R&E credit so that businesses can make investments in research projects, confident that they can benefit from the credit in the future. The President has placed a high priority on making the credit permanent, proposing this in his previous two budgets as well.
- **Increasing the Alternative Simplified Credit Rate by More than 20 Percent.** While the President has previously proposed making the R&E credit permanent, the Administration now also proposes to increase the rate of the alternative simplified credit from 14 percent to 17 percent. This will provide a larger incentive to increase research and simplify the credit by encouraging firms to switch to the alternative simplified tax credit base. The Administration's proposal maintains the current regular research credit to prevent disruption to firms that choose to continue claiming the regular research credit.

This proposal is estimated to provide approximately \$106 billion in tax credits for FY 2012 through FY 2021. The expectation is that this enhanced and permanent credit will fund more than \$10 billion per year in research activity in the United States, supporting nearly 1 million jobs in research.

To understand how these changes might impact a company, consider a hypothetical large manufacturing corporation that has average qualified research expenses of \$460 million for 2009 through 2011 and is considering whether to make research expenditures of \$700 million in 2012.¹⁵ Assume that the corporation has \$9 billion in average gross receipts for 2009 through 2011, that its fixed base percentage is 4.1 percent, and that it claims the regular research credit instead of the alternative incremental credit. Table 4 shows that under those assumptions, the corporation would earn \$66 million under either the regular research credit or the alternative simplified credit under current law if it made \$700 million in research expenditures in 2012. However, under the Administration's proposal – as Table 4 shows – the corporation could receive a credit of \$80 million by electing the alternative credit (line 9), an increase of \$14 million (line 10).

¹⁴ Under the ASC, the rate is reduced to 6 percent if a taxpayer has no qualified research expenses in any one of the three preceding taxable years.

¹⁵ This example assumes that the R&E credit is in effect in 2012.

In these examples, the Administration’s proposal would provide an incentive to increase research spending by reducing the after-tax cost of the research.

Table 4. Computation of the R&E Tax Credit

	\$ millions
Qualified research expenses:	
1 Wages	500
2 Supplies	180
3 Eligible contract research expenses	20
4 Total qualified research expenses (line 1 +line 2 + line 3)	700
Alternative Simplified Credit (ASC):	
5 Average research expenses for the prior 3 years	460
6 Base amount (.5 x line 5)	230
7 Qualified research expenses in excess of base amount (line 4 - line 6)	470
8 ASC credit under current law (.14 x line 7) ^a	66
9 ASC credit under FY 2012 Budget proposal (.17 x line 7) ^a	80
10 Increase in the credit (line 9 - line 8)	14
Regular Research Credit:	
11 Average gross receipts for the prior 3 years	9,000
12 Ratio of research expenses to gross receipts for 1984 through 1988	0.041
13 Base amount ^b	369
14 Qualified research expenses in excess of base amount (line 4 - line 13)	331
15 Regular credit under current law (.2 x line 14) ^c	66

- a Taxpayers have the option of reducing the deduction for research expenses by the amount of the credit or reducing the amount of the credit by 65% of the amount otherwise allowed. In this example, the reduced credits would be \$43 million under current law and \$52 million under the proposal.
- b The base amount cannot be less than 50% of total qualified research expenses.
- c Taxpayers have the option of reducing the deduction for research expenses by the amount of the credit or reducing the credit rate to 13% (65% of 20%). In this example, the reduced regular credit would be \$43 million.

Conclusion

The R&E tax credit encourages technological developments that are an important component of economic growth. Recent studies show that the credit produces approximately a dollar for dollar increase in current research spending and that this amount could be larger in the longer run. Thus, this research shows that the R&E credit is a cost-effective way to encourage research.

However, uncertainty about the future availability of the credit diminishes its incentive effect because it is difficult for taxpayers to factor the credit into decisions to invest in research projects that will not be initiated and completed prior to the credit's scheduled expiration. Further, the outdated and complex formula for determining the regular R&E credit has become an increasingly inaccurate measure for determining a firm's incremental research expenditures.

To address these issues, the Administration proposes to make the research credit permanent and improve its incentive effect. A permanent research credit would improve the credit's incentive effect by providing businesses with certainty that they can make investments in long-term research projects and benefit from the credit over the course of the project. Increasing the rate of the alternative simplified credit from 14 percent to 17 percent will provide an improved incentive to increase research and, because the simplified credit base updates itself, the credit will more accurately reflect a firm's current operations.

The Administration's proposal for a permanent and enhanced R&E credit will provide an incentive for undertaking research activity in the United States by providing an estimated \$106 billion in tax credits that will support nearly 1 million jobs in firms conducting the research.

Appendix: Additional Details on the Research and Experimentation Tax Credit – Defining Qualified Research

Qualified research expenses eligible for the research credit generally consist of: (1) in-house expenses of the taxpayer for wages and supplies attributable to qualified research; (2) certain time-sharing costs for computer use in qualified research; and (3) 65 percent of amounts paid or incurred by the taxpayer to certain other persons for qualified research conducted on the taxpayer's behalf ("contract research expenses"). Qualified research expenses include 100 percent of amounts paid or incurred by the taxpayer to an eligible small business, university, or Federal laboratory for qualified energy research.

To be eligible for the credit, the research must satisfy a number of requirements. The research must be undertaken for the purpose of discovering information that is technological in nature; the application of the research must be intended to be useful in the development of a new or improved business component of the taxpayer; and substantially all of the research activities must constitute elements of a process of experimentation for functional aspects, performance, reliability, or quality of a business component.

Research does not qualify for the credit if substantially all of the activities relate to style, taste, cosmetic, or seasonal design factors. In addition research does not qualify for the credit if (1) conducted after the beginning of commercial production of the business component; (2) related to the adaptation of an existing business component to a particular customer's requirements; (3) related to the duplication of an existing business component from a physical examination of the component itself or certain other information; or (4) related to certain efficiency surveys, management function or technique, market research, market testing, or market development, routine data collection or routine quality control. Research does not qualify for the credit if it is conducted outside the United States, Puerto Rico, or any U.S. possession.

To be eligible for the credit, research expenditures must be expenditures incurred in connection with the taxpayer's trade or business which represent research and development costs in the in the experimental or laboratory sense.