

Economic Impact Update for 16 Tech Innovation District Development -- Data and Findings

November 16, 2018

Capturing and Calculating the Potential Economic Impacts of 16 Tech

Background

16 Tech, Indianapolis' new innovation district under development, is advancing in its early stages and has the potential to be a “game changer” for innovation-driven economic development for both the City and the broader Central Indiana region. The Brookings Institution, a thought-leader working in this exciting place-based economic development space describes innovation districts as “dense enclaves that merge the innovation and employment potential of research-oriented anchor institutions, high-growth firms, and tech and creative start-ups in well-designed, amenity-rich residential and commercial environments.”¹ These districts have emerged and advanced in technology- and knowledge-centric communities such as San Francisco, Boston, Atlanta, Seattle, St. Louis, and Philadelphia, where the co-location of R&D and innovation drivers such as universities, academic medical centers, and/or corporate R&D facilities with industry and desirable amenities is fostering collaborations and connections, attracting skilled talent, and ultimately leading to innovation and economic gains.

While still in development, and with significant work still to be done to see the District realize its full vision, BioCrossroads and 16 Tech have asked TEconomy Partners, LLC (TEconomy) to estimate the potential economic impact of 16 Tech through its initial phase of development, as well as other supporting analyses. The economic impact estimates, presented in this report, are based on the current status and projected plans for the development provided by 16 Tech to TEconomy. The analysis updates and builds upon some aspects of a prior assessment conducted by the TEconomy team while with Battelle's Technology Partnership Practice, that were published in a 2015 report for BioCrossroads—*Impact of Talent on Innovation: Recent Trends and Implications for the Indy Metro*.²

This briefing report begins with an overview of the economic impact methodology and approach as well as key assumptions for this forward-looking assessment. It continues then with the estimated economic impacts of 1) construction activities and then 2) full build-out/full occupancy of the district following Phase 1 of the 16 Tech development.

Assessing the Economic Impact of Innovation Districts

Innovation Districts are understood to have a positive impact on job creation, attraction, and retention. By their very nature and design, Innovation Districts have strong connections to existing anchor research and innovation entities, whether university, biomedical, or corporate. These connections may manifest into some relocation of existing employment into a District, typically combined with, often significant growth. The most important employment growth opportunities stem from the new start-ups and high-growth firms that place a premium value on the synergies, networking, and collaborative possibilities driven by the Innovation Districts' form, function, and programming. Additionally, substantial and varied employment is generated through the development of supporting amenities in the district (e.g., retail, restaurants, and housing). Given the emerging nature of this shared innovation and economic development model, few, if any, Innovation Districts have existed for a significant length of time to fully understand the job creation portfolio and the extent to which jobs that arise in the District are entirely new versus relocated from elsewhere in the state/region. With that acknowledged, each type of District job—whether newly created or relocated—plays an important part in developing and maintaining the desired interconnections within an Innovation District.

¹ Brookings Institution, see: <https://www.brookings.edu/innovation-districts/>.

² The full report is available at: <https://www.biointellex.com/wp-content/uploads/2015/09/Indy-Talent-Driving-Innovation-Report.pdf>.

Economic Impact Modeling Overview

Impact analysis makes use of an input-output (I/O) model to represent the interrelationships among economic sectors.

- Input-output multipliers are based on the flow of commodities between industries, consumers and institutions in a regional economy.
- The data also show consumption activities by workers, owners of capital, and imports from outside the region. The trade flows built into the model permit estimating the impacts of one sector on other sectors.
- Premise is that every dollar spent in the economy (the direct impact) is re-spent on the purchase of additional goods or services generating additional economic activity and impact (the multiplier – indirect and induced effect).

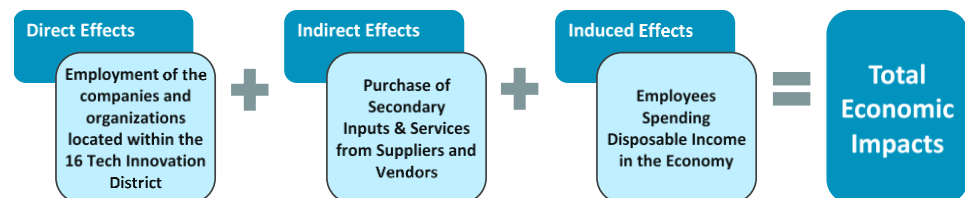
This analysis was performed using Indianapolis-Carmel-Muncie MSA specific input-output model from IMPLAN.

- The IMPLAN model is the most widely used model in the nation and is based on the U.S. Bureau of Economic Analysis (BEA) national accounts data, supplemented with state level employment data from the U.S. Bureau of Labor Statistics (BLS) and other economic data from U.S. Bureau of the Census.
- The impacts are modeled using the most detailed sectors available within the IMPLAN model to represent the 16 Tech construction and occupancy-based employment.
- The MSA model is used to better model the actual flows of purchases in the regional economy. Using a Marion County-only model would generate spurious results as purchased inputs and employees are not always going to be supplied from or reside in Marion County or the City of Indianapolis.

Input/Output as a Tool to Calculate Economic Impact

The trade flows built into the IMPLAN input/output (I/O) model permit estimating the impacts of one sector on other sectors. These impacts consist of three types of effects:

- **Direct Effects** - the specific impact of the firm(s) and sector(s) in question
- **Indirect Effects** - the impact on suppliers to the focus companies
- **Induced Effects** - the additional economic impact of the spending of employees in the overall economy
- **Total Impact** - the aggregated direct, indirect, and induced effects.



In other words, the I/O analysis models the “ripple effect” that originates from the expenditures of 16 Tech located firms in the economy, flows through suppliers and vendors as additional inputs are purchased, and through employees who spend their wages in the economy.

Types of “Economic” Impacts Captured and Estimated

The IMPLAN model was used to estimate five types of impacts:

- **Output**, also known as production, sales, or business volume, is the total value of goods and services produced in the economy. The output impacts are often referred to as the “economic impacts”.
- **Employment** is the total number of jobs created; includes the direct jobs paid for through salary and benefit expenditures and indirect/induced jobs generated through purchase expenditures.
- **Labor Income** is the total amount of income, including salaries, wages and benefits, received by employees and other workers in the economy;
- **Value Added** is the total amount of “value” added to the production output by employment, including labor income. Output minus the value of all purchased inputs (e.g., materials, components, shipping) equals value added.
 - For each of these four impact types above, an impact **multiplier** is also provided—for every one (job or dollar) of direct effect, the multiplier number will equal the total (*including the direct effect*) number of jobs or dollars created in the regional economy. Thus, for example, an employment multiplier of 2.05 would indicate that, on average, for every 1 direct job located within the 16 Tech Innovation District an additional 1.05 indirect and induced jobs are created in the region’s economy.
- **Government Tax Revenues** includes the estimated revenues of state/local and federal governments from all sources as a result of the output and employment impacts estimated.

Assessment of Construction Impacts

Overview

- Data provided by 16 Tech on current cost estimates for Phase 1 construction activities by building and/or project across four types – 1) basic infrastructure (e.g., bridge, roads, walkways, green space, core utilities), 2) laboratory space, 3) office and other commercial space (including retail, hotel, and parking structure construction) and 4) multi-family residential space.
- Phase 1 construction activities are estimated to be completed by the end of 2027.

Construction Cost Inputs

Phase 1 Construction Costs (2018\$) by Year and Impact Model Sector (\$Millions)

Impact Model Sector	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Infrastructure Construction*	\$3.5	\$25.2	\$18.0	\$22.9	\$9.7	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$-	\$79.2
Innovation Space Construction - Laboratory	\$-	\$38.5	\$41.4	\$23.9	\$13.9	\$39.0	\$25.1	\$25.1	\$-	\$-	\$-	\$-	\$-	\$207.0
Innovation Space Construction - Office/Commercial	\$2.0	\$4.8	\$30.5	\$17.6	\$13.3	\$16.7	\$3.4	\$13.3	\$9.9	\$9.9	\$-	\$-	\$-	\$121.4
Multi-Family Residential Construction	\$-	\$-	\$19.9	\$38.4	\$18.5	\$24.8	\$6.3	\$13.0	\$6.8	\$6.8	\$-	\$-	\$-	\$134.3
Phase 1 - Totals	\$5.5	\$68.4	\$109.8	\$102.9	\$55.4	\$80.4	\$34.8	\$51.4	\$16.7	\$16.7	\$-	\$-	\$-	\$541.9

* = Removes expenditures for land acquisition as these are wealth transfers versus impact driving expenditures.

Construction Impacts

- Construction activities, as “temporary” at a specific construction site, provide impacts stemming from the construction activities for the duration of construction only. For cumulative, multi-year analysis, jobs are specified as job years.
 - Example: 1 worker on the job for 1 year – 1 job year; 1 worker on the job for three years is 3 job years.
- Planned construction activities will generate nearly 3,600 direct job years and a total employment impact of more than 6,300 job years from 2018-2027.
- Cumulative, Phase 1 construction will also generate \$29 million in state/local tax revenues over the 10-year period.

Total Phase 1 Construction Impacts (2018-2027) (\$ Values in 2018\$ Millions)

Impact Type	Employment (Job Years)	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	3,580	\$211.20	\$263.26	\$541.91	\$7.82	\$40.83
Indirect Effect	1,052	\$64.13	\$102.01	\$181.01	\$8.51	\$14.22
Induced Effect	1,696	\$87.54	\$150.72	\$246.87	\$12.77	\$19.98
Total Impacts	6,327	\$362.88	\$515.99	\$969.79	\$29.10	\$75.03
<i>Multiplier</i>	<i>1.77</i>	<i>1.72</i>	<i>1.96</i>	<i>1.79</i>		

Estimation of Full Build-Out/Full Occupancy Employment

Employment Estimation Parameters (jobs per sq. ft., etc.)

- While an overall emphasis of the 16 Tech space will be on “innovation” activities (e.g., science, research, engineering, IT), the full development will also include necessary and expected amenities to both support district employees as well as drive additional economic activity in the District.
- Based upon current planning and space allocations by type of space, estimations of the number of employees for each space type can be developed using the following occupancy parameters.
 - These parameters, assembled by TEconomy from a wide variety of sources (including various real estate publications, the US Green Building Council, and discussions with architectural firms) are fairly conservative in nature (e.g., lower employment densities). For example, previous occupancy estimates performed for 16 Tech used an average “350 sq. ft. per occupant” for the Innovation office and laboratory space.
 - These parameters are designed to include a per person (or per job) share of common space such as hallways, meeting rooms, lobbies, and restrooms.

Space Type and Occupancy Modeling Parameters

Impact Type	Employment
Innovation Space	
Office	1 job per 400 sq. ft.
Laboratory	1 job per 450 sq. ft.
Maker Space	1 job per 1,000 sq. ft.
Retail/Restaurant	
Restaurant/Café/Coffee-Sandwich Shop	1 job per 150 sq. ft.
Retail/Boutiques	1 job per 400 sq. ft.
Space “Average” for Modeling	1 job per 275 sq. ft.; 1.5 multi-shift factor
Hotel (mid-level)	1 job for every three rooms; 1.25 multi-shift factor
Multi-family Residential	1 site manager per facility .5 ass’t manager per 50 units 1 full time maintenance per 75 units

Full Build Out/Full Occupancy Employment Estimation

- Using the current design plans and the occupancy modeling parameters an employment estimate at full Phase 1 build out and full occupancy can be developed. This estimate is 2,889 total jobs.
- Key considerations when comparing to the previous 2015 plan estimates:
 - For the research/innovation office and laboratory space a more conservative space per job estimation is used in the current plan. As the needs of tenants are considered, a higher density may be obtained than currently estimated.
 - For retail/restaurant/other amenity space a more conservative and “average” space per job estimation is used given the complexities of commercial development. A multi-shift multiplier is now included in the jobs estimation.
 - For hotel space a more conservative space per job estimation is used, but a smaller, “mid-higher end” hotel is estimated, increasing the base shift employment, plus the multi-shift nature of hotels is fully modeled in the current estimate.
 - Multi-family residential space is nearly doubled in the current plan. Previous estimates did not develop any management employment for these buildings.

Employment by Type of Use

Type of Uses	Current 2018 Plan			Previous 2015 Plan*	
	Estimated Square Feet per Job	Phase 1		Phase 1	
		Estimated Square Feet	Jobs	Estimated Square Feet	Jobs
Advanced Industries/ Innovation-Related	n/a	864,659	2,062	870,000	2,263
Research/Innovation - Office	400	681,827	1,705	600,000	2,123
Research/Innovation - Laboratory	450	142,832	317	230,000	100
Maker Space	1,000	40,000	40	40,000	40
Retail, Hotel & Amenity	n/a	268,161	877	358,000	415
Retail/Restaurant/Other Amenity	275	143,816	773	178,000	361
Hotel	Jobs Based on # of Rooms	124,345	104	180,000	54
	Number of Rooms	250			
Multi-Family Residential	Job Profile Based on # of Bldgs. and Units	895,000	26	450,000	n/a
	Number of Units (~1,011 sq. ft per unit)	885			
Total	n/a	2,027,820	2,965	1,678,000	2,678

*The data from the previous 2015 plan by types of uses have been adjusted to fit the 2018 types of uses for comparability purposes, including dividing the previous incubator space into research/innovation office and laboratory space and including the previous health and fitness space under the retail/restaurant/other amenity space. The 2015 total estimated square feet and total direct jobs created have not been adjusted.

Estimation of 16 Tech Occupancy Employment and Economic Impacts

Employment Estimation Approach – Each Building Achieves Full Occupancy After Three Years

- A full occupancy-based employment level is calculated using the jobs per sq. ft. parameters and other employment per space parameters established in the previous table.
- For most structures, employment begins to be generated in the first post-construction year and reaches full occupancy by the end of the third year.
- Residential and hotel-related employment is estimated at full (required) employment at opening for all structures.

Cumulative Employment by Structure by Year

Structure	Completion Year	Cumulative Employment by Year End													Full Occupancy
		2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
IBRI Building	2020			140	257	278	299	299	299	299	299	299	299	299	299
CEG	2020				55	110	165	165	165	165	165	165	165	165	165
CEG Annex	2020				15	30	45	45	45	45	45	45	45	45	45
Building 2	2021					71	196	323	323	323	323	323	323	323	323
Multi-Family (262 units)	2021					7	7	7	7	7	7	7	7	7	7
1250 Indiana	2020				52	103	155	155	155	155	155	155	155	155	155
1200 Indiana	2021					33	67	100	100	100	100	100	100	100	100
Structured Parking	2021														0
Hotel (250 beds)	2027											129	155	180	180
1500 Indiana (88 units)	2025									29	58	88	88	88	88
1430 Indiana (35 units)	2025									16	31	47	47	47	47
Residential (367 units)	2023							81	162	243	243	243	243	243	243
1302 Indiana	2023							173	347	520	520	520	520	520	520
Innovation and Waterway	2025									263	526	789	789	789	789
Residential (133 units)	2027											4	4	4	4
Total Phase 1 Occupancy		0	0	140	379	632	934	1,348	1,603	2,165	2,472	2,914	2,940	2,965	2,965

Cell Color Legend

- Orange Cell = Existing IBRI and CIGP Employees move into IBRI Building by mid-2020.
- Yellow Cells = indicate linear employment growth over three years across all types of occupancy and employment.
- Teal Cells = indicate steady state, full occupancy employment levels.
- Purple Cells = indicate base level management/support for residential ONLY structures.

- The building and occupancy model generates 2,062 innovation/advanced industries-oriented employees within the 16 Tech Innovation District by the end of 2030.
- The retail, restaurant, other amenity, and residential features of the District will require and generate an additional 903 jobs by the end of 2030.

Cumulative Employment by Employment Type by Year

Employment Category	Cumulative Employment by Year End												
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Innovation/Advanced Industries			140	368	596	880	1,145	1,269	1,615	1,839	2,062	2,062	2,062
Retail/Restaurant				11	29	47	187	317	529	611	722	748	773
Hotel Management and Service											104	104	104
Apartment/Condo Management					7	7	17	17	22	22	26	26	26
Total			140	379	632	934	1,349	1,603	2,166	2,472	2,914	2,940	2,965

Phase 1 Economic Impacts: 2030 and Cumulative 2018-2030

- With the Phase 1 occupancy-based employment plan (as described above), by 2030 the 16 Tech Innovation District will reach 2,965 direct jobs and will generate an additional 3,160 jobs throughout the Indianapolis-Carmel-Muncie MSA. By 2030 the District and its impacted employment will generate over \$1 billion in total output and generate more than \$42 million in state and local tax revenue, annually.

Total Phase 1 Occupancy Employment Impacts (2030) (\$ Values in 2018\$ Millions)

Impact Type	Employment	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	2,965	\$237.82	\$334.19	\$518.77	\$20.15	\$49.99
Indirect Effect	1,263	\$86.57	\$131.80	\$204.74	\$6.89	\$17.96
Induced Effect	1,897	\$103.15	\$177.58	\$287.95	\$15.05	\$23.54
Total Impacts	6,125	\$427.53	\$643.57	\$1,011.46	\$42.09	\$91.50
<i>Multiplier</i>	2.07	1.80	1.93	1.95		

- From a cumulative perspective, the Phase 1 occupancy-based employment plan for the 16 Tech Innovation District will generate a total of more than 18,400 “job years” (1 job for 1 year = 1 job year) over the total 2018-2030 period. The increasing employment over this 13-year period, will generate a cumulative total of \$121 million in state/local taxes for the region from the District’s “direct” employment and generate more than \$262 million in total state/local taxes.

Total Phase 1 Cumulative Occupancy Employment Impacts (2018-2030) (\$ Values in 2018\$ Millions)

Impact Type	Employment (Job Years)	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	18,494	\$1,535.07	\$2,143.24	\$3,328.78	\$121.67	\$321.58
Indirect Effect	8,299	\$557.51	\$846.98	\$1,313.66	\$43.94	\$115.53
Induced Effect	12,487	\$665.41	\$1,145.58	\$1,866.36	\$97.08	\$151.88
Total Impacts	39,280	\$2,758.00	\$4,135.81	\$6,508.80	\$262.69	\$589.00
Multiplier	2.12	1.80	1.93	1.96		