

# The Feasibility of Using Big Data & AI for Development

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# UNICEF has created a Big data & AI platform

## *Magic Box*

**Our purpose is to**

- **Provide** UNICEF and governments with new and faster ways of analyzing the world
- **Generate** critical insights into the needs of populations

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### Magic Box is made possible through

 **Financial contributions** from private sector partners + governments

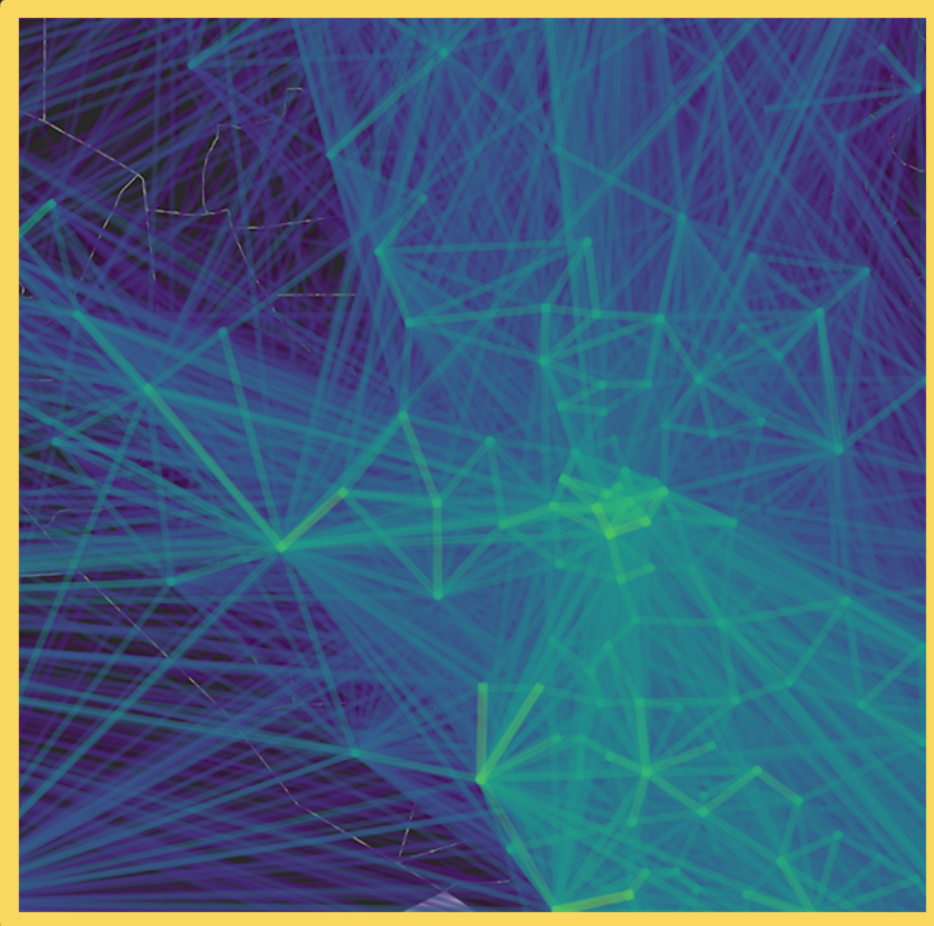
 **Data donations** from private sector companies

 **Tech expertise** from companies & organizations

 **Country-level** pilots + **collaborations** with start-ups



# We work on diverse topics



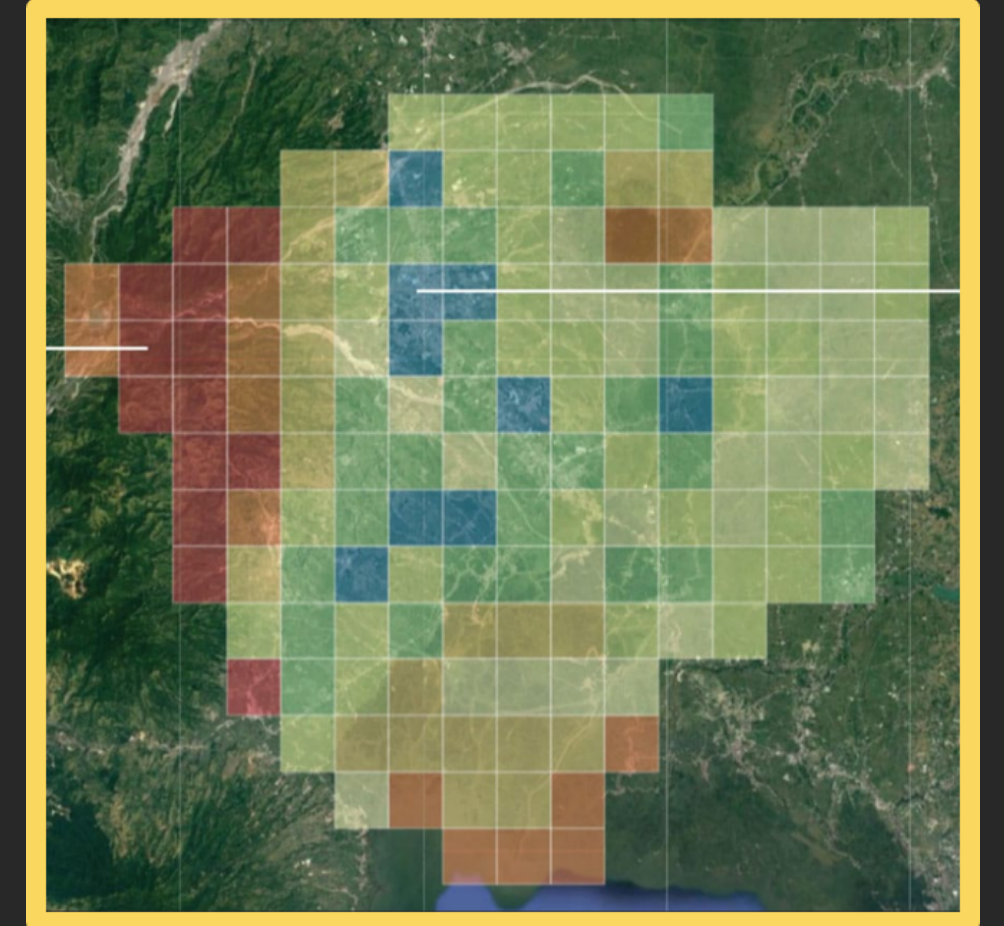
migrations



crop mapping



population estimation



poverty detection



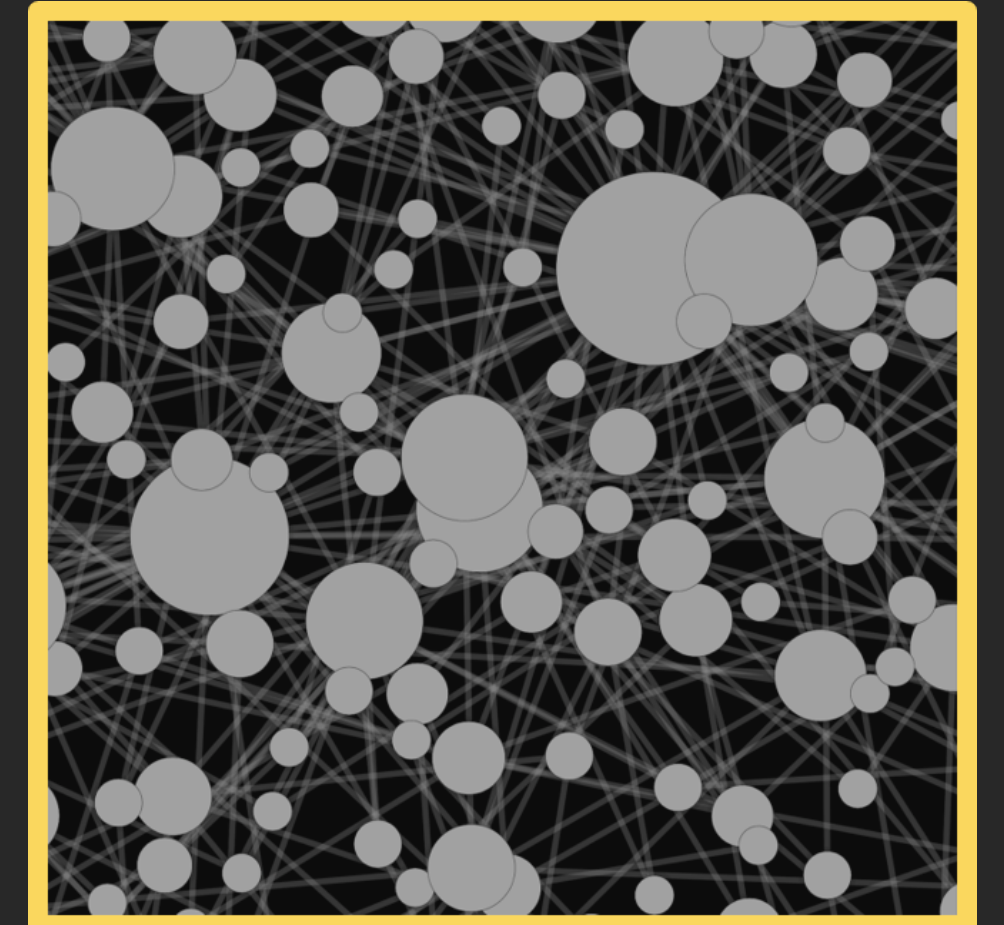
epidemics



informal settlements



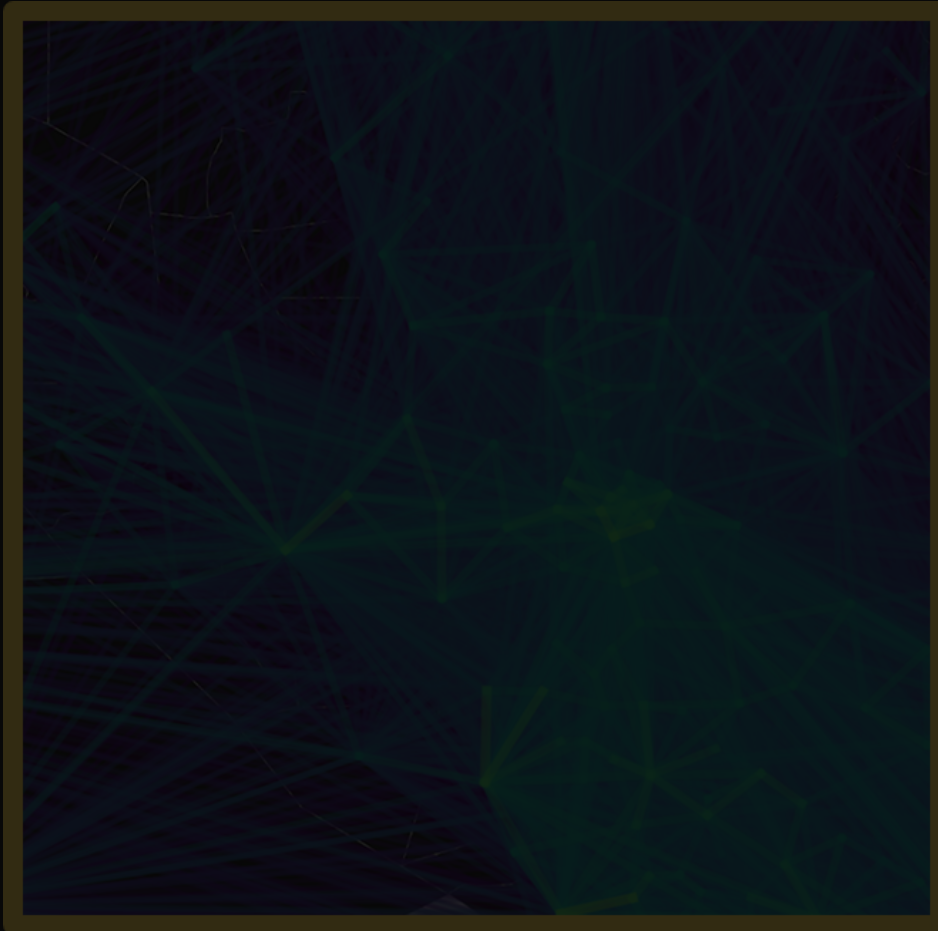
natural disasters



fairness & bias of AI



# We work on diverse topics



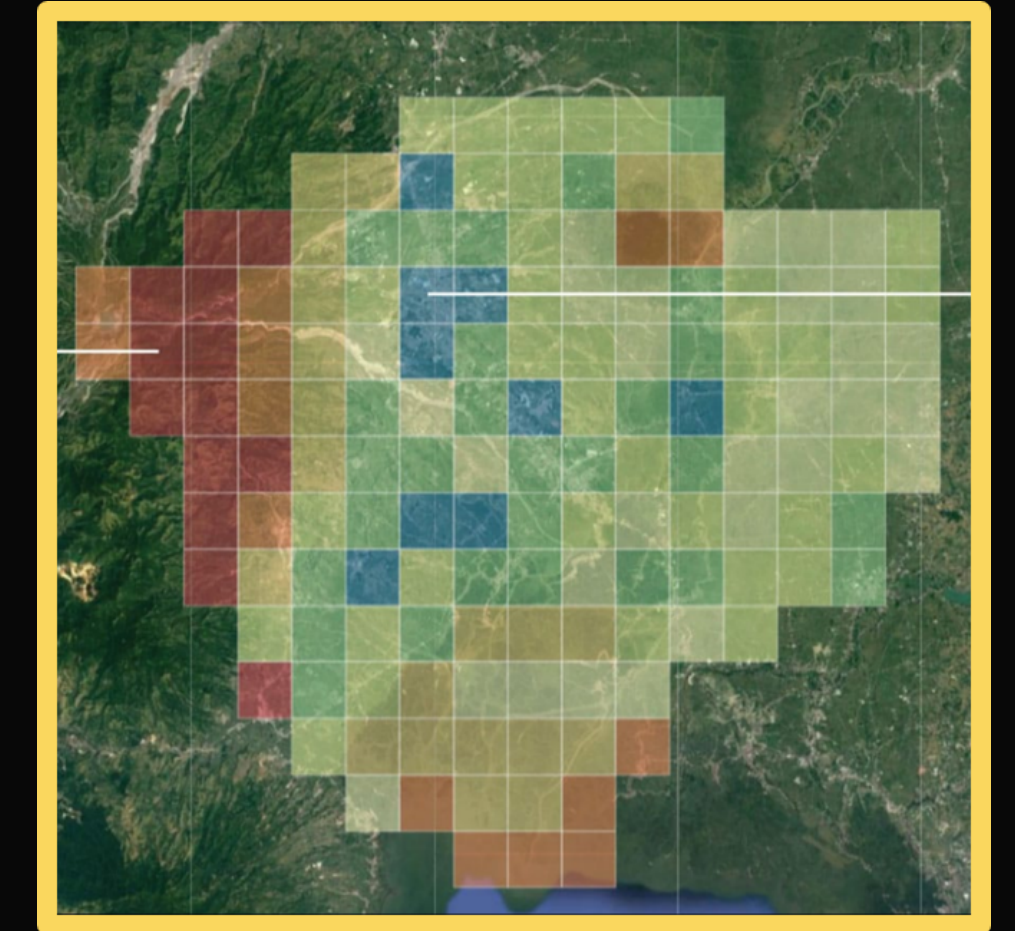
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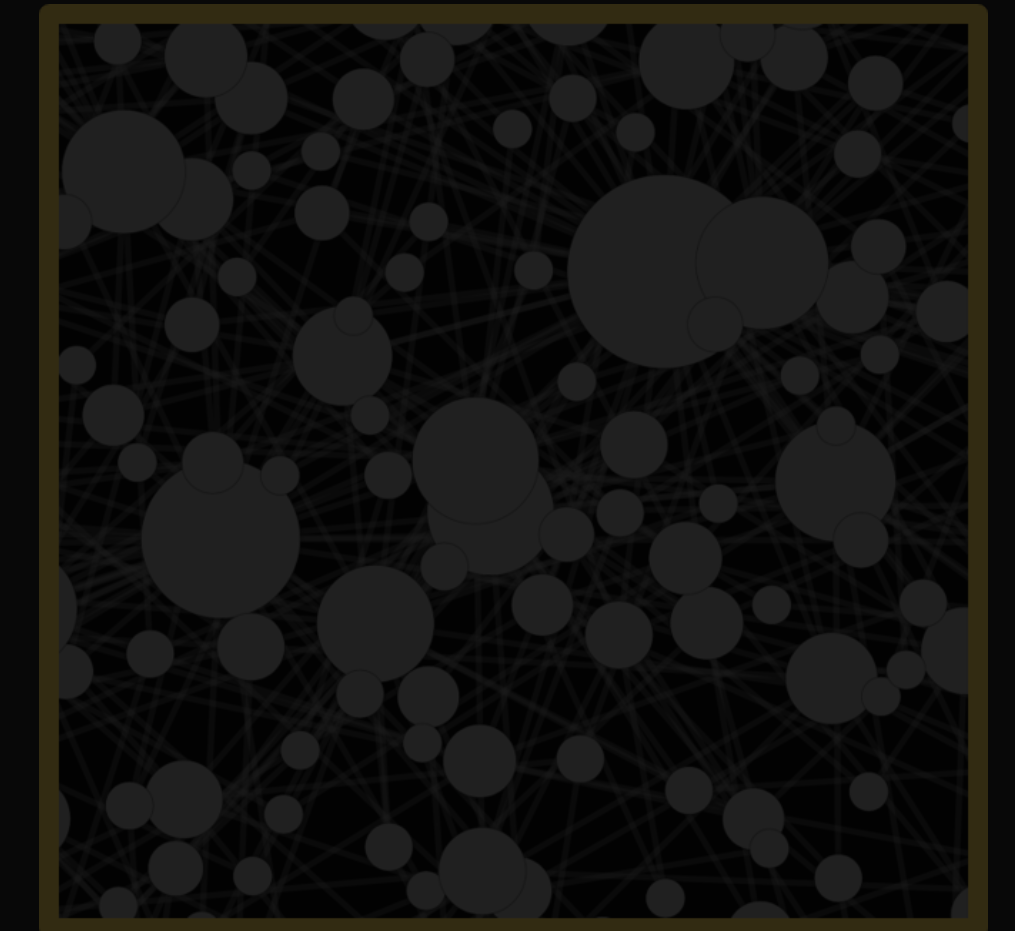
epidemics



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natural disasters



fairness & bias of AI



# 1 billion children live in poverty

Accurate and updated estimates of population demographics are vital in order to understand and respond to social and economic inequalities, and to achieve the SDGs



# Poverty Mapping

## the traditional way

	HOUSEHOLD MEMBERS GRID					
	01	02	03	04	05	06
1.0	.....	.....	.....	.....	.....	.....
1.1	1 2	1 2	1 2	1 2	1 2	1 2
1.2	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999
1.3	1 →1.4 2 →NEXT PERSON	1 →1.4 2 →NEXT PERSON	1 →1.4 2 →NEXT PERSON	1 →1.4 2 →NEXT PERSON	1 →1.4 2 →NEXT PERSON	1 →1.4 2 →NEXT PERSON
1.4	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999	YEAR <input type="text"/> <input type="text"/>  MONTH <input type="text"/> <input type="text"/>  -888 -999
1.5	CODE <input type="text"/> <input type="text"/>	CODE <input type="text"/> <input type="text"/>	CODE <input type="text"/> <input type="text"/>	CODE <input type="text"/> <input type="text"/>	CODE <input type="text"/> <input type="text"/>	CODE <input type="text"/> <input type="text"/>
1.6	1 →1.7	1 →1.7	1 →1.7	1 →1.7	1 →1.7	1 →1.7

# Problems with surveys

**Resources** Surveys are expensive and time consuming

**Conflict** Security concerns can make data collection impossible and dangerous to collect

**Recency** Surveys can quickly become outdated

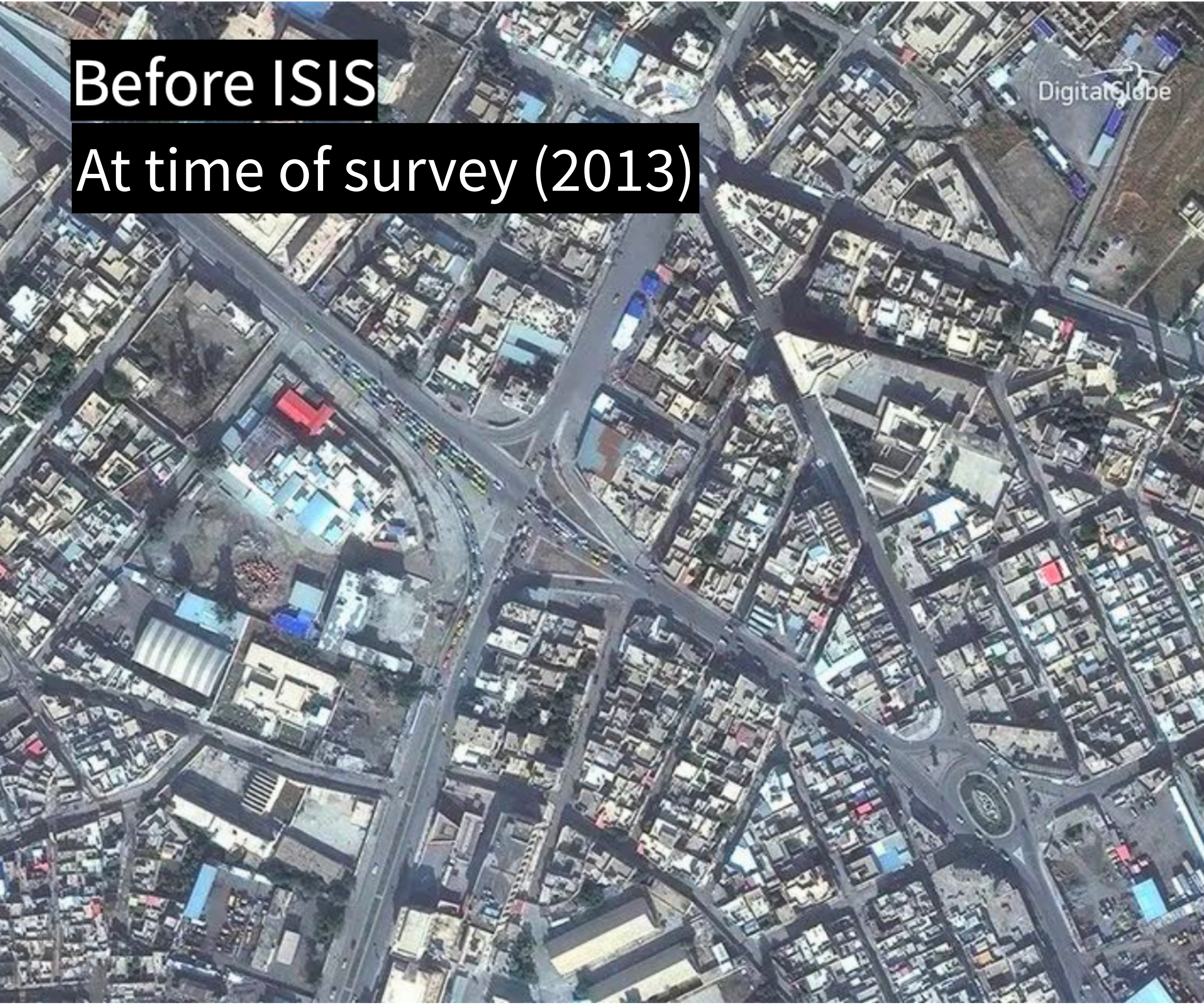


# Mosul

*Iraq*

Before ISIS

At time of survey (2013)



After ISIS

2 years after (2015)





**Can we use new technologies to  
complement surveys?**



**This is poverty**







**This is wealth**

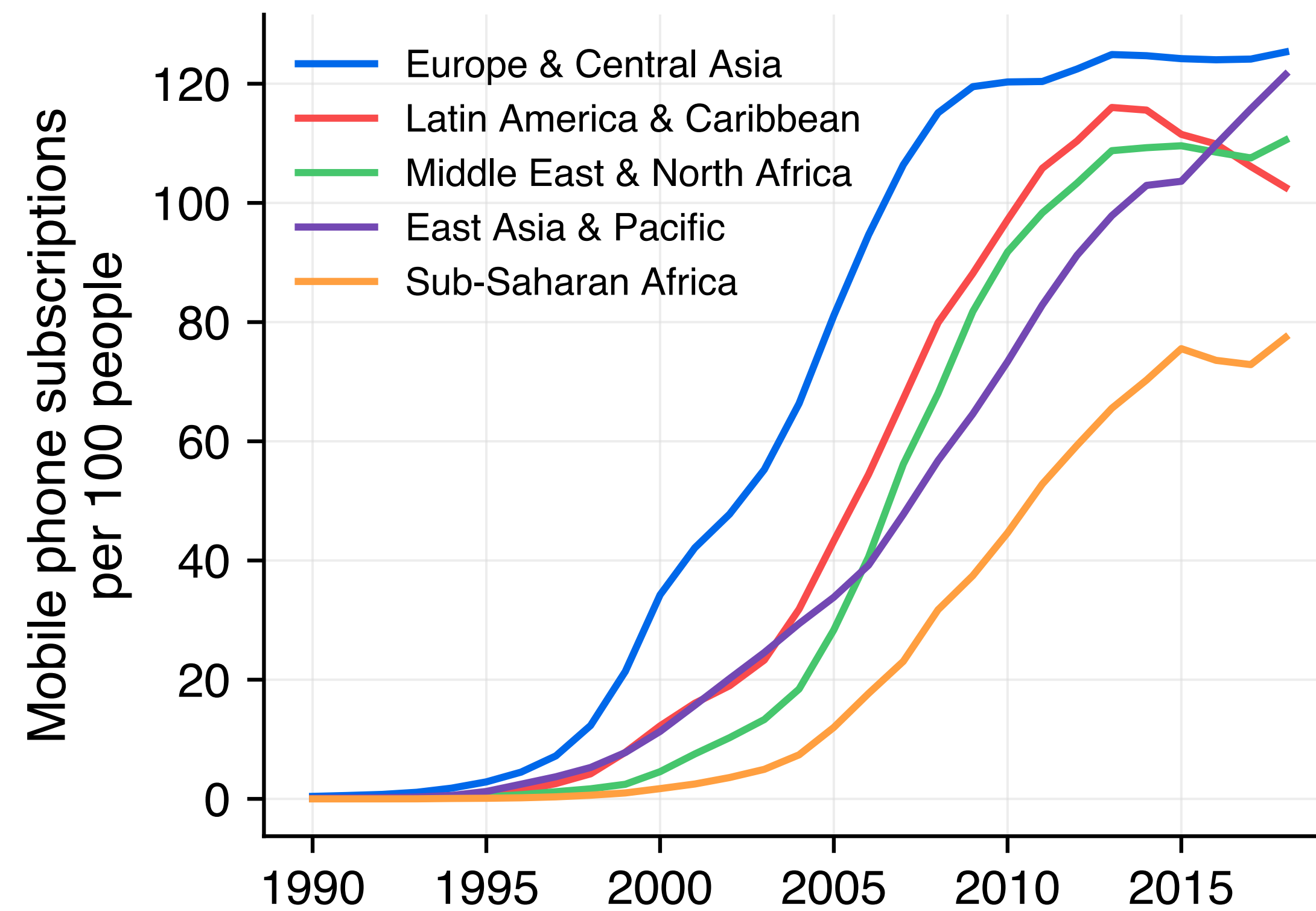


# This is what we see from data



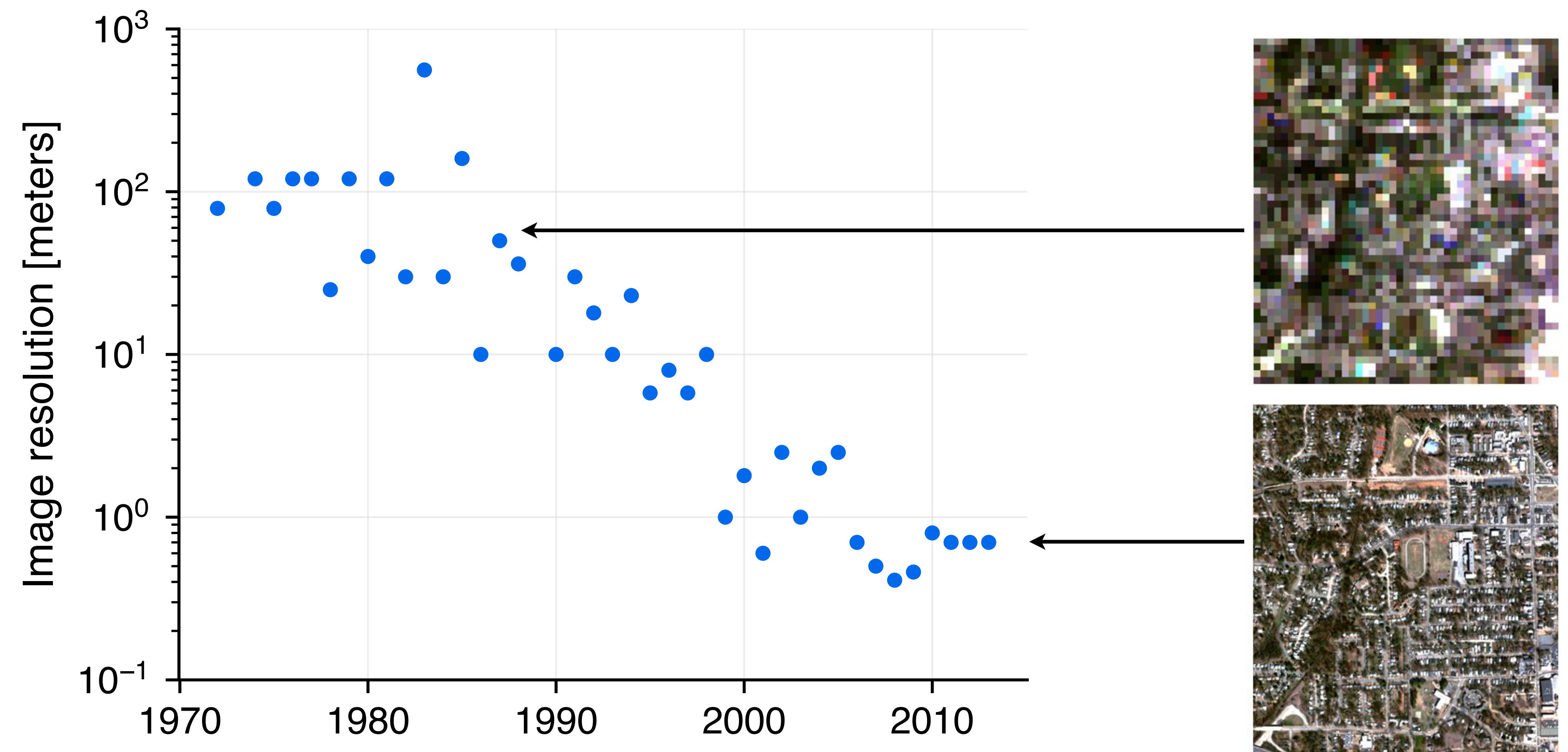


# Mobile phone adoption it at an all time high





# Satellites are able to capture our world in greater detail





# Can we use alternative data + methods to measure poverty?

binding pocket that would require a conformational change to accommodate ubiquitin (Fig. 4A). Because the  $\beta$  sheet of the Ubiquitin finger region is in an open conformation even in the absence of ubiquitin (Fig. 4A), it is possible that interactions between Ubiquitin and the other DUBs substrate help to maintain a conformation that favors ubiquitin binding. Interactions of the upper portion of the finger domain with Ser73 helix c2 and with Ssn1 (Fig. 1A and 4C) form extensive contacts that may favor the open conformation of Ubiquitin. Ser73 may also play a general role in stabilizing the conformation of the Ubiquitin domain. Ubiquitin forms the most extensive interface with Ser73, with a total area of 3075 Å<sup>2</sup>, as compared with the other pairwise domain interactions in the DUBs. Note that Ser73 is the "nucleus" that holds together the two lobes of the DUBs complex (Fig. 4C); it promotes interactions between the two lobes and aligns Ser71 and Ssn1, which also contact the Ubiquitin domain at the interface between the two lobes. Although the structure of the Ubiquitin-Ubiquitin domain on its own is not known, it is possible that these extensive interactions with Ser73 may also help to stabilize the overall USP fold or to affect protein dynamics in a way that favors the catalytically competent structure.

The structure of the SAGA DUBs suggests how this module interacts with its natural, *in vivo* substrate, monoubiquitinated histone H2B within a nucleosome. The electrostatic surface potential of the DUBs (Fig. 4D) reveals a basic region that could favor interactions with the negatively charged DNA when the nucleosome is positioned with ubiquitinated K123 or H2B in the active site of Ubiquitin. This region of the DUBs is positively charged because of the zinc finger module of Ser71, which contains four basic residues (R78, R84, R91, and R95) (Fig. S11) that are conserved in ATNTN1, the human homolog of Ser71. Two additional C-terminal arginine residues, R98 and R99, which are disordered in

the structure but are also conserved in the human homolog, would further contribute to the strong positive charge in this region. Figure S12 shows a model for how a yeast nucleosome (17) interacts with ubiquitinated K123 of H2B can dock on the DUBs, with ubiquitin in the active site as seen in the Ubiquitin-Ubiquitin structure (Fig. 1D). This arrangement brings the basic patch on the DUBs in close apposition with the DNA, which favors interactions with the sugar-phosphate backbone. The interdependent structural and functional roles of the four SAGA DUBs proteins in mediating factors of Ubiquitin. Ser73 may also play a general role in stabilizing the conformation of the Ubiquitin domain. Ubiquitin forms the most extensive interface with Ser73, with a total area of 3075 Å<sup>2</sup>, as compared with the other pairwise domain interactions in the DUBs. Note that Ser73 is the "nucleus" that holds together the two lobes of the DUBs complex (Fig. 4C); it promotes interactions between the two lobes and aligns Ser71 and Ssn1, which also contact the Ubiquitin domain at the interface between the two lobes. Although the structure of the Ubiquitin-Ubiquitin domain on its own is not known, it is possible that these extensive interactions with Ser73 may also help to stabilize the overall USP fold or to affect protein dynamics in a way that favors the catalytically competent structure.

## Network Diversity and Economic Development

Nathan Eagle,<sup>1,2\*</sup> Michael Macy,<sup>1,3</sup> Rob Cusumano<sup>1,4</sup>

Social networks form the backbone of social and economic life. Until recently, however, data have not been available to study the social impact of a national network structure. To that end, we combined the most complete record of a national communication network with national census data on the socioeconomic well-being of communities. These data make possible a population-level investigation of the relation between the structure of social networks and access to socioeconomic opportunities. We find that the diversity of individuals' relationships is strongly correlated with the economic development of communities.

Theoretical work suggests that the structure of social relations between individuals may affect a community's economic development. More precisely, economic opportunities are

more likely to come from contacts outside a tightly knit local friendship group. Hence, higher, clustered, or insular social ties are predicted to limit access to social and economic prospects

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## Science (2010) Diversity of social network (careful crafting of features)

### REPORTS

1. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

2. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

3. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

4. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

5. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

6. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

7. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

8. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

9. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

10. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

11. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

12. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

13. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

14. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

15. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

16. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

17. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

18. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

19. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

20. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

21. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

22. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

23. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

24. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

25. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

26. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

27. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

28. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

29. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

30. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

31. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

32. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

33. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

34. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

35. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

36. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

37. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

38. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

39. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

40. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

41. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

42. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

43. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

44. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

45. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

46. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

47. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

48. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

49. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

50. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

51. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

52. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

53. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

54. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

55. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

56. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

57. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

58. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

59. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

60. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

61. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

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63. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

64. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

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66. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

67. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

68. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

69. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

70. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

71. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

72. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

73. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

74. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

75. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

76. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

77. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

78. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

79. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

80. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

81. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

82. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

83. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

84. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

85. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

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87. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

88. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

89. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

90. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

91. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

92. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

93. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

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95. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

96. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

97. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

98. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

99. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

100. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

101. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

102. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

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104. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

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106. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

107. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

108. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

109. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

110. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

111. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

112. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

113. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

114. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

115. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

116. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

117. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

118. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

119. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

120. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

121. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

122. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

123. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

124. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

125. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

126. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

127. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

128. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

129. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

130. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

131. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

132. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

133. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

134. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

135. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

136. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

137. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

138. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

139. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

140. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

141. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

142. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

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144. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

145. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

146. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

147. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

148. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

149. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

150. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

151. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

152. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

153. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

154. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

155. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

156. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

157. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

158. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

159. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

160. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

161. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

162. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

163. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

164. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

165. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

166. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

167. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

168. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

169. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

170. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

171. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

172. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

173. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

174. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

175. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

176. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

177. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

178. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

179. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

180. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

181. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

182. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

183. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

184. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

185. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

186. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

187. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

188. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

189. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

190. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

191. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

192. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

193. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

194. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

195. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

196. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

197. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

198. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

199. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

200. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

201. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

202. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

203. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

204. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

205. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

206. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

207. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

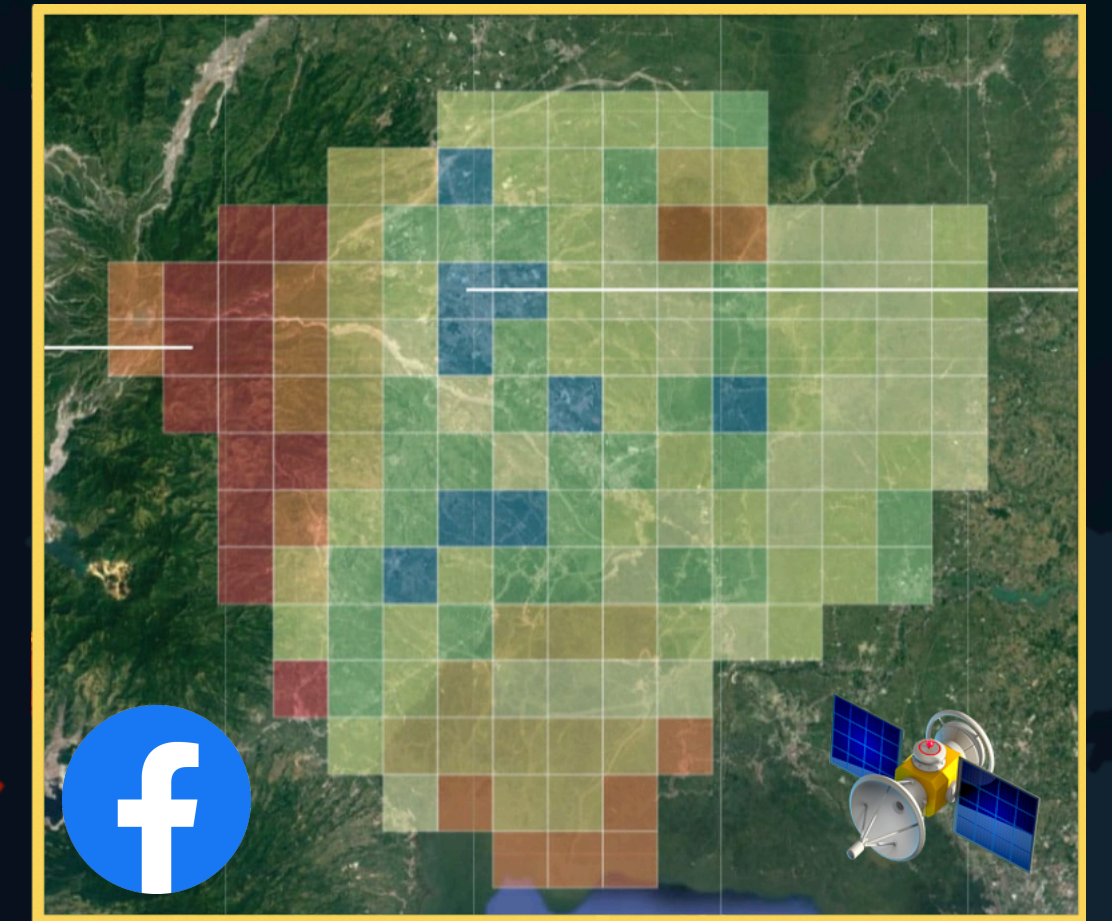
208. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

209. L. J. Compton, D. R. Bentley, *Ann. Rev. Genet.* **43**, 559 (2009).

210. L. J. Compton, D. R. Bentley,



# We have tested different approaches across multiple contexts



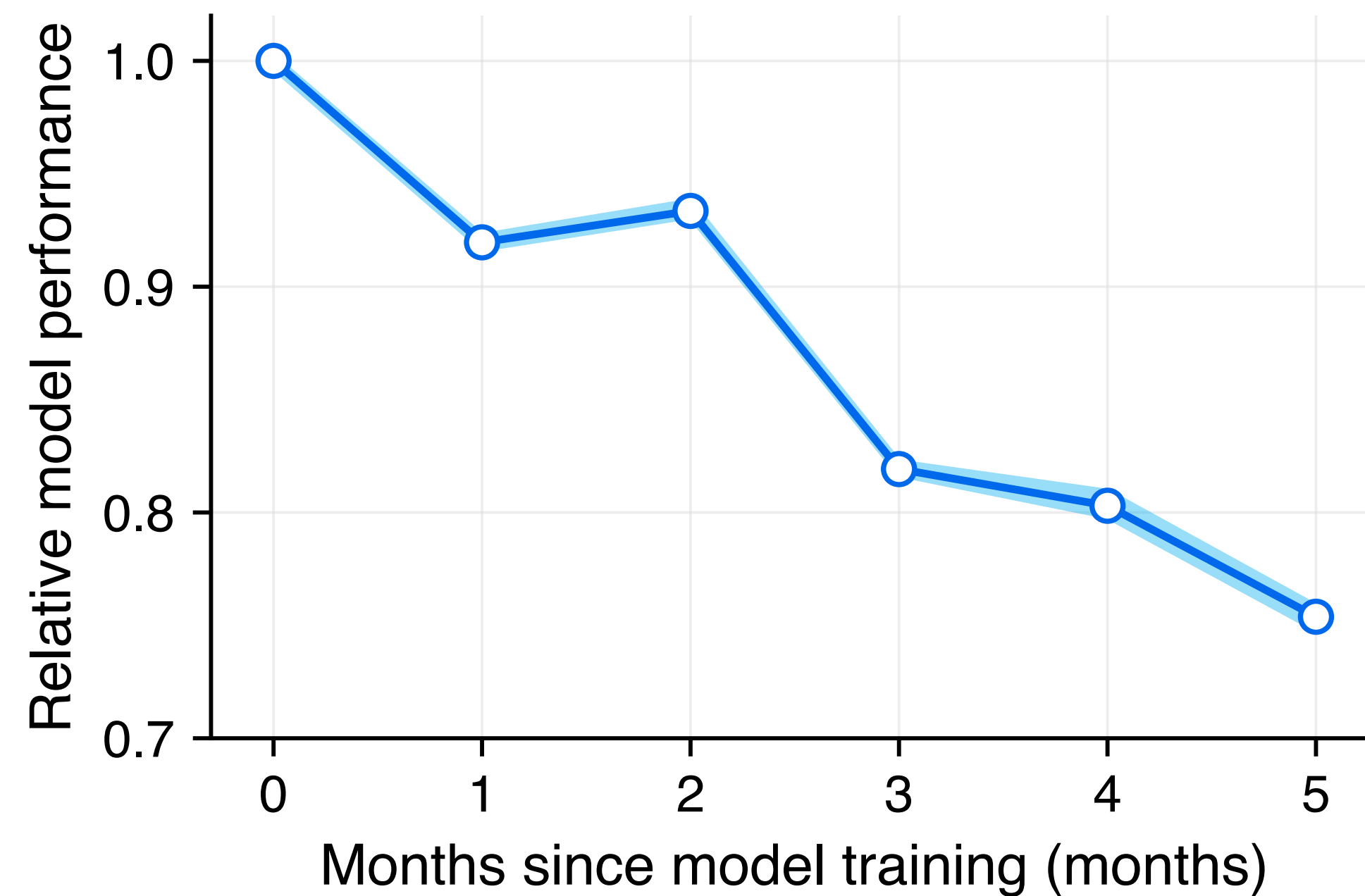


**We learned 3 things ...**



# We learned 3 things ...

## 1. Operationalizing models is hard

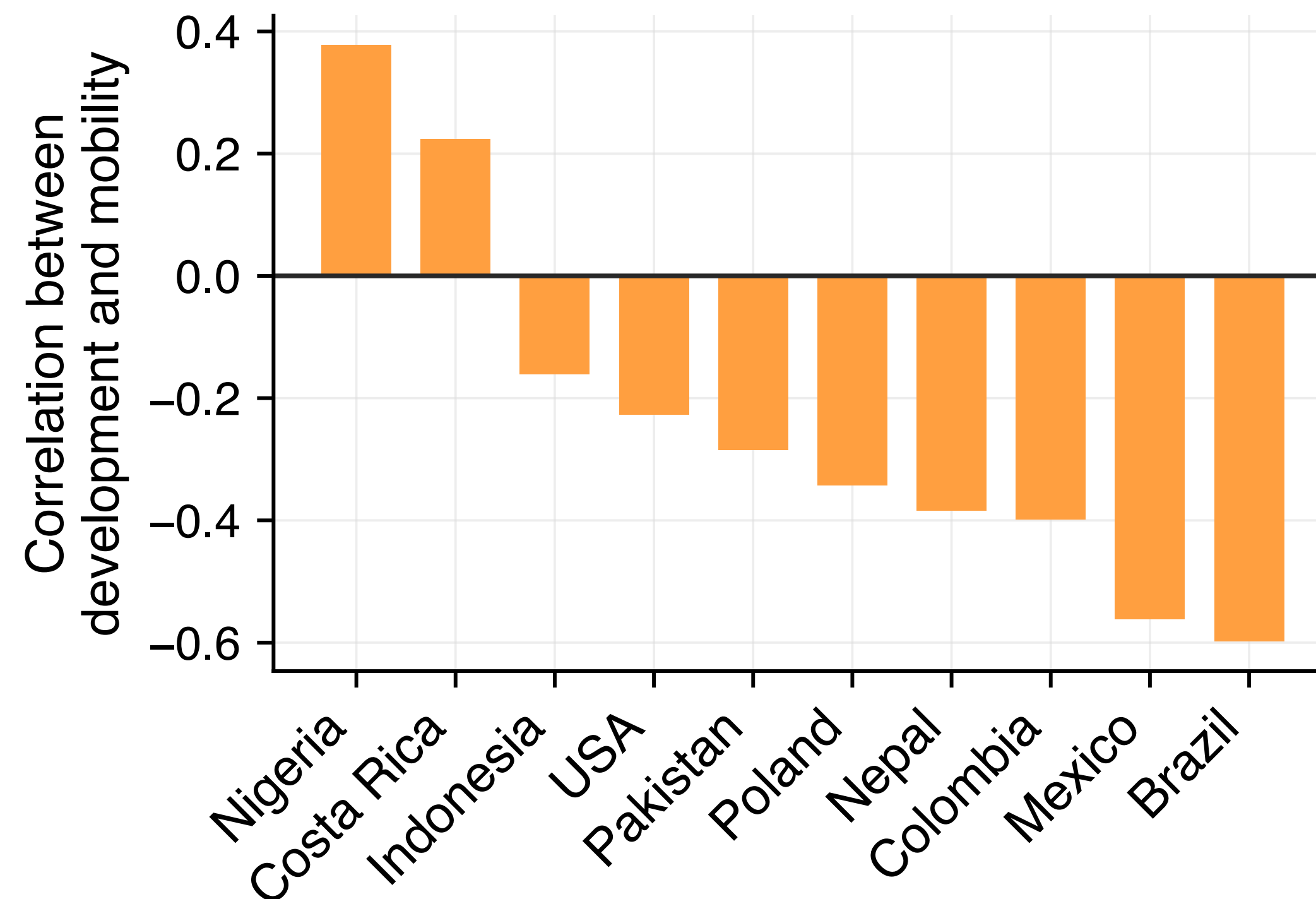




# We learned 3 things ...

**1.** Operationalizing models is hard

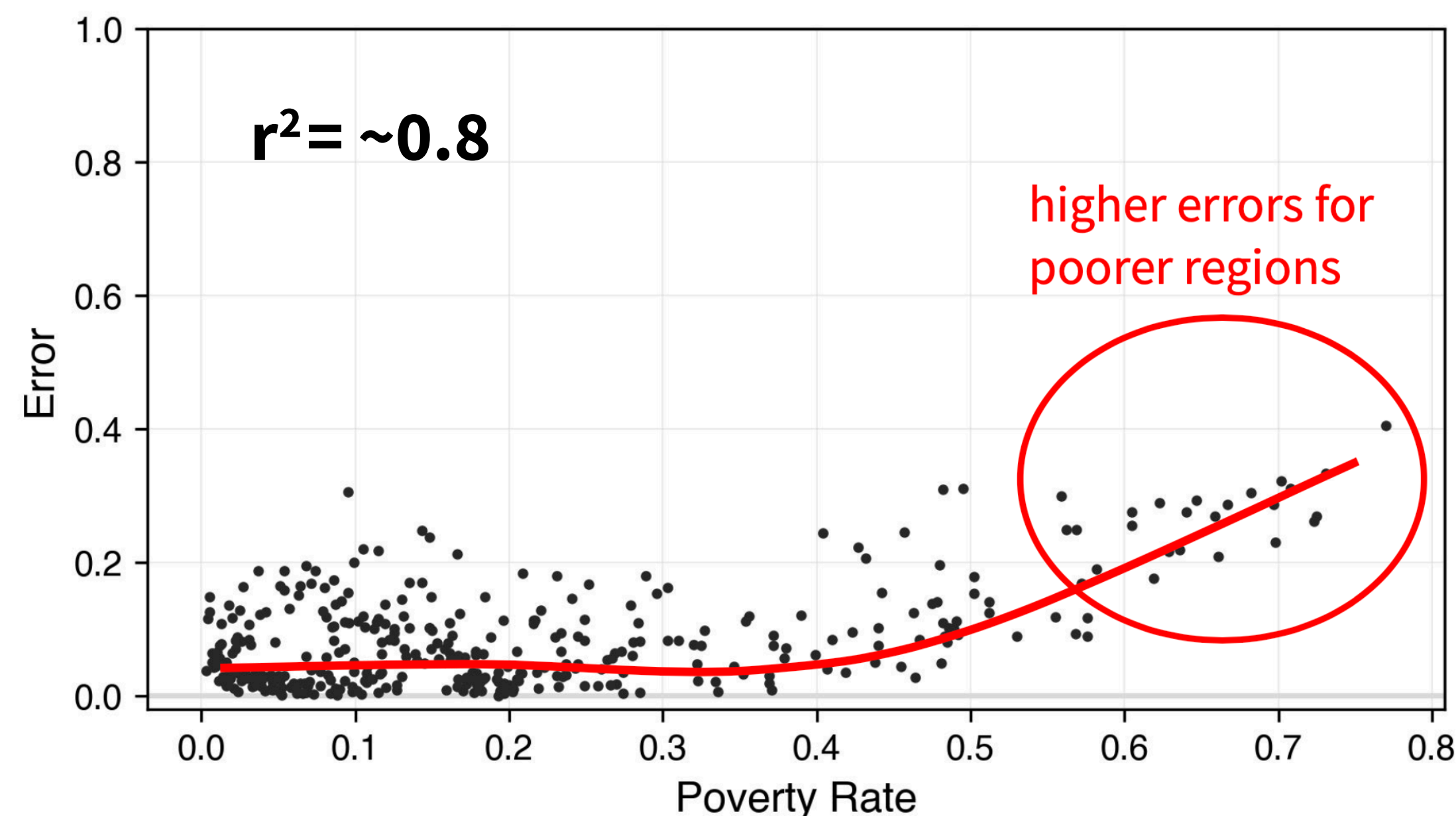
**2.** Transferring models across countries is difficult





# We learned 3 things ...

1. Operationalizing models is hard
2. Transferring models across countries is difficult
3. Algorithmic bias disadvantages poorer communities





# What is the future of Big Data & AI for development?



## **Networks are vital!**

We need broad collaborations between academia and international agencies



## **Where is the talent?**

We need capacity in UN to absorb academic work and to understand limitations and caveats of AI models



# Not everything that is important can be measured!



## **Child poverty is different from adult poverty**

Different needs, experiences, and consequences



## **Children are invisible in household based measures**

How to fix it? It should be measured for each individual child!

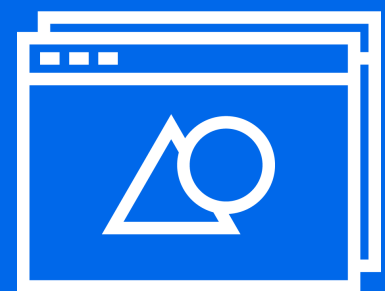


## **Poverty is not a single measure**

Poverty is multidimensional and manifests in different ways for children  
(UNICEF is actively looking into this through a Data Collaborative with Uni. of Edinburgh)



# Would you like to know more?



*Check out our webpage*

<https://www.unicef.org/innovation/magicbox>



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